AMERICAN GAS JOURNAL

99th YEAR — FEBRUARY 1946 — VOL. 164 NO. 2

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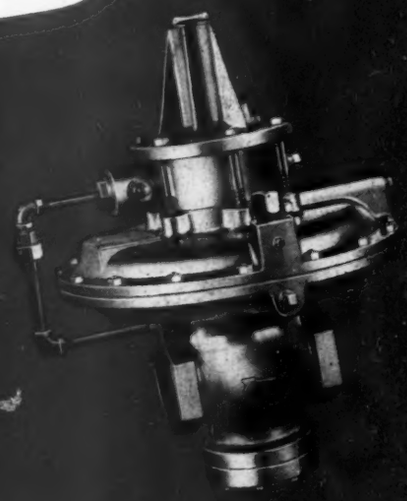

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Gas as an industry comes in for a large share of value from this design promotion. It's a publicity "natural" for local gas companies. Large amounts of space in advertising and news stories are being used to ask the public to help plan America's most popular gas range of the future . . . extra proof that the gas industry is always on the lookout for new ideas. Such space and time by your local press and radio give added importance to gas as the truly modern fuel in your community.

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Magic Chef

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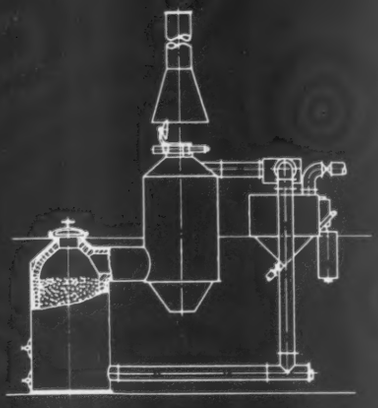
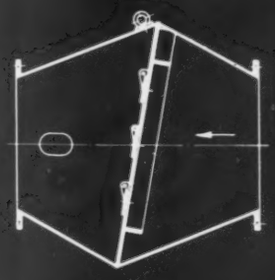
LOOK FOR THE FAMOUS RED WHEEL . . . THE MARK OF DEPENDABILITY

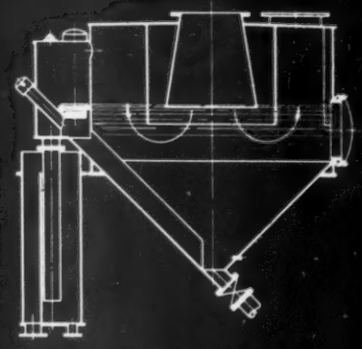
AMERICAN GAS JOURNAL, February, 1946. Vol. 164, No. 2. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York 7, N. Y. Entered as second-class matter, October 7, 1928, at the post office at East Stroudsburg, Pa., under the Act of March 3, 1879. Printed in U. S. A.



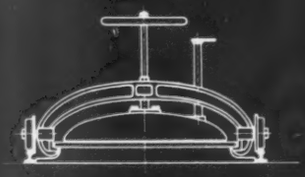
BLUE GAS MACHINE



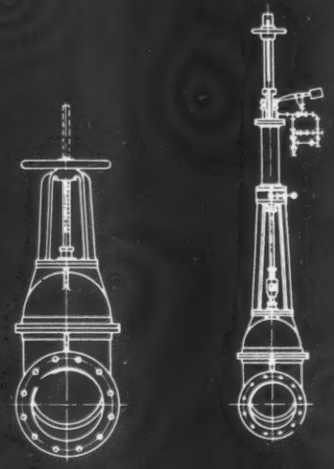
CHECK VALVE



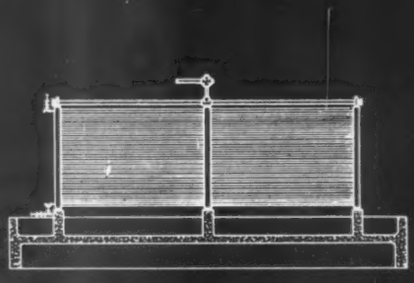
HYDRAULIC SEAL
OR
WASH BOX



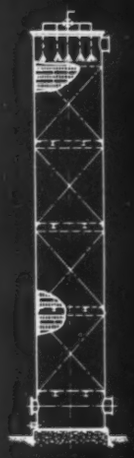
CHARGING DOOR



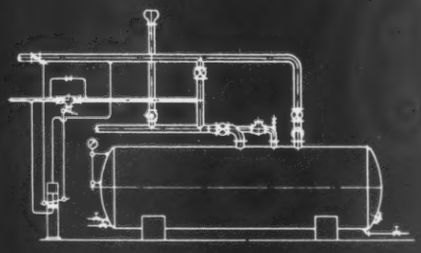
HAND OPER. HYDR. OPER.
GATE VALVES



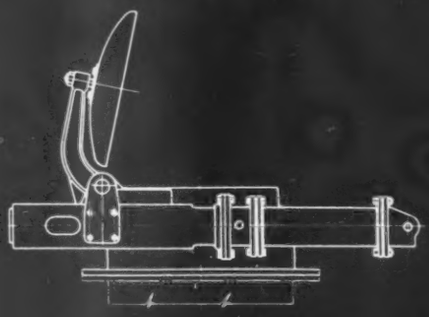
COOLING COIL



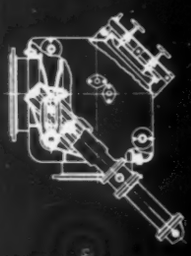
GAS SCRUBBER



STEAM ACCUMULATOR

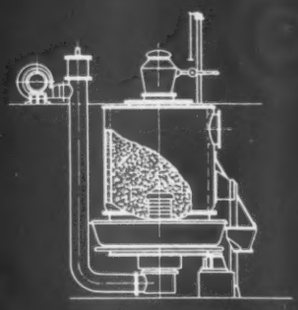


HYDRAULIC OPER.
STACK VALVE

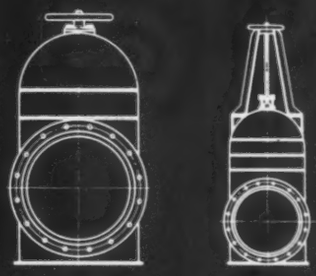


HYDRAULIC OPER.
REVERSING VALVE

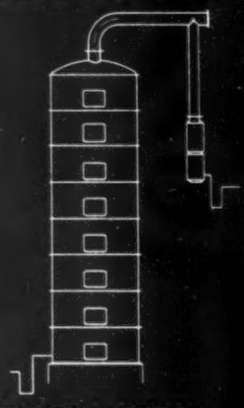
WASTE HEAT BOILER



GAS PRODUCER



BLAST GATES



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TODAY more people than ever before are thinking about new Gas Refrigerators. To help you take advantage of this great opportunity, Servel is now running a powerful national advertising campaign. In these exciting, four-color ads, Fred MacMurray, Joan Bennett, Jerry Colonna, Jane Wyman, Claire Trevor, Ray Milland and other famous stars, tell in their own words why they prefer Servel to all other refrigerators.

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Servel

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CRITERION COAL — High grade gas, by-product, steam and domestic coal—Pittsburgh seam from Irwin Basin, Westmoreland County, Pennsylvania, on the Penna. Railroad.

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Old Kentucky — Hazard No. 4 and No. 7 steam and domestic coal from Wiscoal, Knott County, Kentucky, on the L. & N. Railroad.

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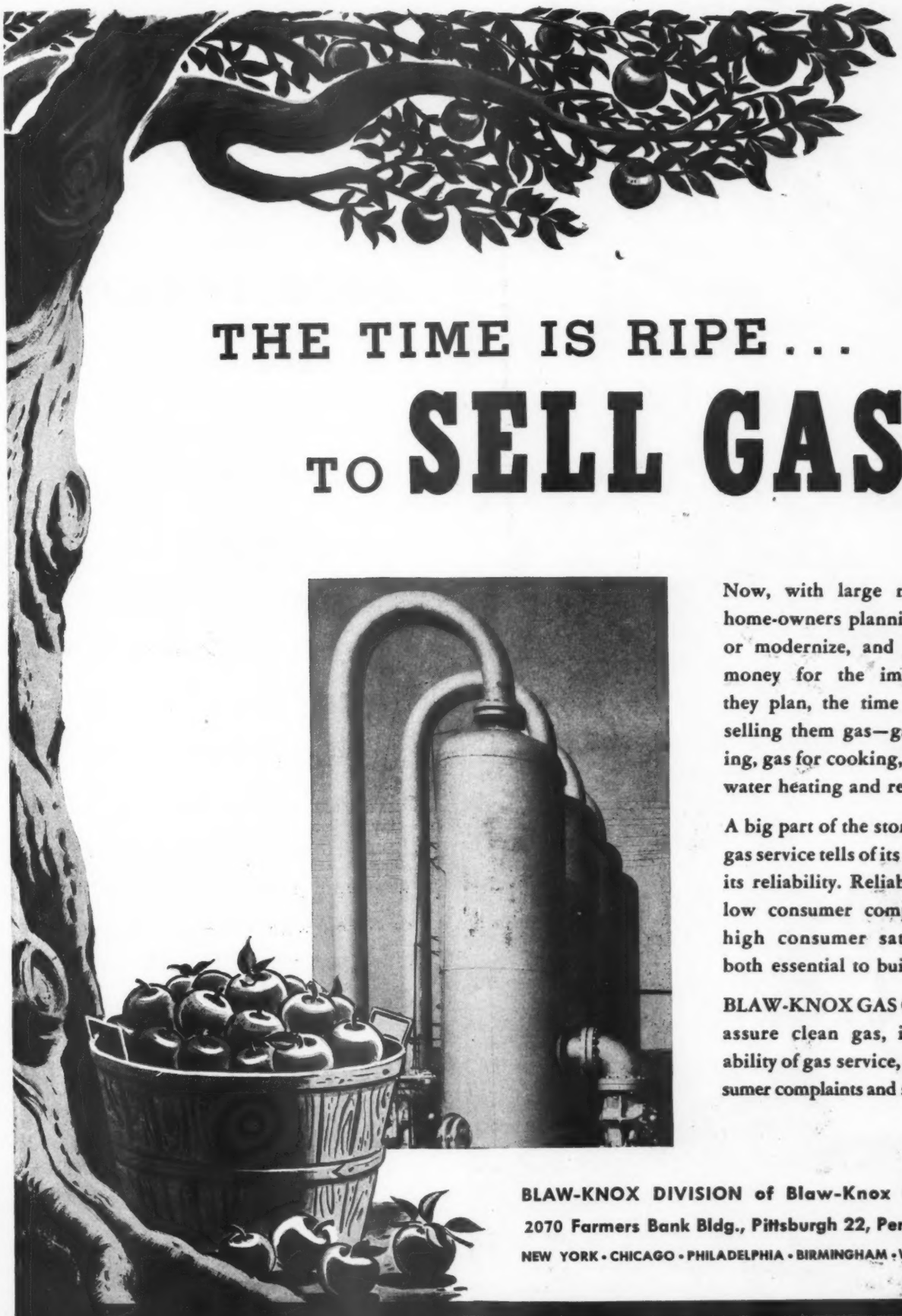

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NUMBER 2

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FEBRUARY 1946

AMERICAN GAS JOURNAL

VOLUME 164 No. 2

LP Gas-Air and Manufactured Gas Mixtures

By
Warren E. Churchill
Chief Chemist
Boston Consolidated Gas Co.

IN CONSIDERING the use of Propane and Butane mixtures with Air for purposes of peak-load shaving, the tests about which this paper is written were made at our McBride Street Service Station. It was desired to learn the limits of complete interchangeability and the most suitable LP Gas-Air mixture for Propane and Butane with 100% Coke Oven Gas, 100% Carburetted Water Gas and an intermediate mixture of these two gases corresponding to the composition of our send-out gas on peak-load days.

The advantage of using LP- Gas-Air mixtures to supplement our coke oven gas output in the Spring and Fall would be considerable, permitting the Water Gas Plant to remain shut down until there is sufficient load to require the continuous operation of at least one set. This arrangement would permit the longer use of generator house personnel for summer maintenance work in the plant.

The choice of appliances representative of those in use in the field was somewhat limited when these tests were begun; however, the following types were obtained:

One 20-gallon underfired automatic hot water storage heater having a round burner with one slotted port and a thermocouple type safety pilot.

One modern gas range.

One six cubic foot refrigerator.

One gas fired steam radiator.

These appliances were equipped with manometers for indicating the respective manifold pressures and were all connected to a common manifold which could be supplied with gas through an 80 cu. ft. wet test meter from either of two 25 cu. ft. gas holders or direct from the street.

In addition to the standard appliances previously mentioned, two others were used to obtain specific information on the test gases.

A laboratory test burner was made from a former side-arm water heater burner which was removed from the heater and fitted with a sampling tube which was brazed to the bottom of the burner head. With this round burner which had raised drilled ports and a straight venturi mixer it was possible to analyze the burner head mixtures obtained with the test gases. The #34 M.S.D. ports and the relatively low burner port rating of 23,200 B.T.U. per square inch of port area, was typical of the older types of top range burners on our lines.

The second piece of equipment found to be very useful was a "Rochester type Test Burner."* Although this burner has not been recommended to be used as the sole factor for determining the interchangeability of gases, it does however permit one to see and compare the cone-forming characteristics of gases.

In order to duplicate field conditions as near as possible, all of the appliances were adjusted for their rated input on 530 B.T.U., 0.38 SP. GR. coke oven gas, with the primary air shutter set to give a flame slightly softer than normal. This has been standard practice in the field to prevent hard flames and flashbacks in the winter time when the specific gravity has been raised as high as 0.50 due to the use of water gas.

In each case the appliance was allowed to operate long enough to heat up so that the burner input reached equilibrium before the rating was set on Coke Oven Gas. In subsequent tests however when burner operation on the LP gas became critical, then operation was checked also from a cold-start.

Both the Propane and Butane were obtained in 100 lb. cylinders. A pressure regulator was used to reduce the gas pressure to 12" H_2O column, the gas then was passed through a tempering coil immersed in warm water so that it entered the storage holders at room temperature.

The test gases were made up in the storage holders, and the oxygen content checked with an Orsat. Junker tests were made to check the heating value of the final mixtures used for testing.

Test Results

Propane-Air and Coke Oven Gas

The first set of tests were made with a 920 B.T.U. propane-air mixture. When this gas was substituted 100% for the .38 Sp. Gr. 530 B.T.U. coke oven gas, the following results were obtained:

A. Modern Gas Range

1. The Giant top burner rated at 12,000 B.T.U./Hr. input with a port rating of 23,600 B.T.U./sq. in. of port area, operated with small luminous tips on the inner cones. The burner input dropped only 0.7%.

2. The Loop type Oven Burner, rated at 22,000 B.T.U./Hr. input with a port rating of 38,900 B.T.U./sq. in., could not operate with the 920 B.T.U. gas due to complete lifting or blowing-off of the flames from the burner head.

** Determination of the Combustion Characteristics of Fuel Gases, by Louis Shnidman, American Gas Journal, December, 1940.*

B. Twenty Gallon Underfired Water Heater

The pilot burner was unstable due to the tendency of the flames to lift momentarily from the ports.

The main burner with an input of 20,000 B.T.U./Hr. and a slotted port with a rating of 25,600 B.T.U./sq. in. operated from a cold start with a luminous fringe to the outer flame. This disappeared when the burner became hot. There was a tendency for the flame to lift from the hot burner.

C. Gas Steam Radiator

This burner having 250 No. 45 M.S.D. drilled ports with a rating of 24,500 B.T.U./sq. in. of area, operated at 32,300 B.T.U./Hr. input without any sign of trouble.

D. Refrigerator

With the No. 96 burner spud normally supplied with this unit, the burner operated with a bright luminous tipped flame with well defined light green inner cones. The input was found to have increased 5.9%. The bypass flame had a luminous tip but the safety pilot remained open all right.

A No. 95 burner spud has been used at the same 2,450 B.T.U./Hr. input to overcome troubles in the field due to insufficient primary-air. This combination with its higher manometer pressure still gave a luminous tipped flame which had a tendency to lift from its port.

The results of the tests with the 920 B.T.U. Propane - Air mixture showed that although the desired B.T.U. vs. specific gravity relationship had been obtained to give the same input rating as on .38 Sp. Gr. 530 B.T.U. coke oven gas, the mixture could not be used as 100% interchangeable because of blowing or lifting flames and luminous tips.

Similar tests made with propane-air mixtures of 855, 751, and 600 B.T.U. per cu. ft. showed that the burner inputs dropped and the tendency toward blowing and lifting flames increased as the heating values were lowered. Tests made with the 980 B.T.U. propane-air mixture showed that the blowing and lifting tendency was not corrected and the burners which previously had slightly luminous flames became decidedly luminous.

The results obtained on the Laboratory Test Burner showed that with the 920 B.T.U. propane - air mixture the same input was obtained as with .38 Sp. Gr., 530 B.T.U. coke oven gas. The flames however were unstable, having light green inner cones with poorly formed tips, showing a tendency to lift from the ports momentarily. Analyses of the burner head mixtures showed them to increase from 169 B.T.U./cu. ft. for coke oven gas to 181 B.T.U./cu. ft. for 920 B.T.U. propane-air.

The Rochester Test Burner gave the following comparison when changing from .38 Sp. Gr. 530 B.T.U. coke oven gas to 920 B.T.U. propane-air mixture:

The burner number (the setting giving an inner cone height of 1") increased from 88 to 127. The total flame height at the burner number setting increased from 2⅞" to 3¼".

The "Yellow Tip Number" for the 920 B.T.U. propane-air mixture was 107 which was considerably higher than the burner number for coke oven gas.

This data further substantiated the appliance tests in showing that although the factors of B.T.U. and specific gravity were properly related, the difference in gas composition was sufficient to prevent complete interchangeability of the 920 B.T.U. propane-air mixture with coke oven gas.

The next series of tests were made to determine the maximum amount of 920 B.T.U. propane-air that could be mixed with coke oven gas and still maintain satisfactory operation of our appliances.

The results showed that 69.0% of the 920 B.T.U. propane-air with the coke oven gas gave an 800 B.T.U., .91 Sp. Gr. gas which was not altogether satisfactory due to a tendency to form luminous tipped inner cones on the range top burner and underfired water heater. There was no sign of any lifting or blowing on the oven burner.

The next mixture consisting of 50.4% of the 920 B.T.U. propane-air with 49.6% coke oven gas gave a 724 B.T.U., .77 Sp. Gr. test gas.

Satisfactory operation was obtained on each of the appliances previously mentioned with no sign of borderline conditions, with the exception of the refrigerator. In this case, the No. 96 burner spud normally supplied gave on the maximum input setting a stable flame which however had a slight luminous tip on the inner cone. The outer flame was blue. The burner input at this point was 1.6% higher than the coke oven gas setting. The bypass flame had a slight luminous tip.

The No. 95 burner spud in the same burner was free from any sign of a luminous tip on the inner cone at the maximum input which was found to be 2.0% over the coke oven gas setting. The bypass flame had a very slight luminous tip.

Tests made with 23.6% of the 920 B.T.U. propane-air with 76.4% coke oven gas, giving a 618 B.T.U., .56 Sp. Gr. mixture, gave an excellent burner operation on all the appliances previously mentioned.

With 9.9% of the 920 B.T.U. propane-air and 90.1% coke oven gas, the resulting 567 B.T.U., .467 Sp. Gr. mixture when interchanged with 100% coke oven gas was distinguishable only by a slight increase in the definition of the inner cones of the various burner flames.

In order to include in our results a luminous flame burner and two blue flame burners with extremely high burner port ratings, a recent set of tests was made on the following equipment:

A modern gas range with a kitchen heating front having a luminous flame burner with a thermocouple type safety pilot. This burner is rated at 30,000 B.T.U. per hour input and has 79 No. 72 M.S.D. ports.

A conversion type automatic hot water heater burner having an input of 9,500 B.T.U./hour and a burner port rating of 55,000 B.T.U./sq. in.

A side-arm automatic hot water storage heater having an input of 25,000 B.T.U./hour with a burner port rating of 55,000 B.T.U./sq. in.

The following results were obtained on a 633 B.T.U., .56 Sp. Gr. test gas consisting of 27.0% of 914 B.T.U. propane-air and 73.0% coke oven gas.

On the luminous flame burner there was a slight elongation of the flames. The luminous tips increased approximately ¼ of an inch in length. The burner input dropped 0.9%.

Both of the blue flame burners with their high port ratings operated with stable flames and no sign of luminous tips in either case.

With 40.4% of the 914 B.T.U. propane-air mixture and 59.6% coke oven gas, a 686 B.T.U., .68 Sp. Gr. test gas gave the following results:

On the luminous flame burner, the luminous tips increased to approximately ⅝" in length. The burner input dropped 1.0%. Both blue flame burners operated satisfactorily.

With a test gas containing 52.6% of the 914 B.T.U. propane-air mixture and 47.4% coke oven gas, having a heating value of 732 B.T.U. and .775 Sp. Gr., the results were as follows:

The luminous flame burner operated satisfactorily. The luminous tips lengthened out approximately ¾ of an inch.

The side-arm water heater burner functioned satisfactorily but the conversion type burner had small luminous tips on the inner cones. When the cast iron combustion chamber was placed over the burner, the luminous tips disappeared.

Limits of Interchangeability

	Propane	*Butane*
With Coke Oven Gas	50%—920 B.T.U.	50%—935 B.T.U.
Carburetted Water Gas and Coke Oven Gas	35%—810 B.T.U.	30%—850 B.T.U.
Carburetted Water Gas	25%—690 B.T.U.	31%—850 B.T.U.

Propane-Air and Carburetted Water Gas-Coke Oven Gas Mixture

The results of tests made with a 41.1% carburetted water gas—58.9% coke oven gas mixture showed that on 810 B.T.U. propane-air mixture provided the proper B.T.U.-specific gravity relationship and was interchangeable up to 35.5% without any signs of instability. Blue flame burners were satisfactory up to 47.3%, while on the luminous flame burner ignition was very slow with a cold burner. Once lighted, the flames appeared quite stable.

Data obtained from the laboratory test burner and Rochester test burner indicated that the 810 B.T.U. propane-air gas was interchangeable with the 41.1% carburetted water gas 58.9% coke oven gas mixture within the limits indicated on the appliance tests.

With a base gas consisting of 55.6% carburetted water gas and 44.4% coke oven gas having a heating value of 534 B.T.U. and specific gravity of .56, it was found that a 790 B.T.U. propane-air mixture was interchangeable up to 32.0%. The upper limit of interchangeability as distinguished by failure on one of the test appliances was not determined for this mixture.

Propane-Air and Carburetted Water Gas Mixtures

Test results were obtained from the operation of the appliances with 100% carburetted water gas as the base gas, using 745 B.T.U. and 690 B.T.U. propane-air mixtures as the diluent gases.

Initial tests showed that the 745 B.T.U. propane-air mixture was a bit too high as the burner input was increased 3.0%. It was possible to add up to 25.5% of this mixture before trouble was encountered. In this case, the luminous flame burner was the limiting factor due to slow ignition of the main burner from the pilot. Once lighted the flames were stable.

Tests made using a 690 B.T.U. propane - air with the carburetted water gas showed that when the proportion of the above propane-air gas reached 25% in the test gas, trouble from slow ignition of the luminous flame burner would be encountered. In this case as also true with the 745 B.T.U. propane-air gas test, the luminous flames were stable once the burner was lighted. The burner input was 1.5% lower than with straight water gas.

The tests made to determine the limits of interchangeability of the following butane - air mixtures were made on the same appliances used on the propane-air mixtures, with the exception of the modern range with the luminous flame kitchen heating burner. The tests made with 100% coke oven gas as the base, did not include any type of luminous flame burner. The remaining tests with the coke oven gas—carburetted water gas base and also those on 100% carburetted water gas do include results obtained with a luminous flame burner mounted without a combustion chamber.

Test Results

Butane-Air and Coke Oven Gas

A 935 B.T.U. Butane-Air mixture was found to be best suited for interchanging with our coke oven gas and could be used in concentrations up to 50% of the test gas mixture with satisfactory operation of the blue flame appliances. When used in excess of 50%, first luminous tips, then blowing and lifting of the flames occurred.

Butane-Air and Carburetted Water-Gas-Coke Oven Gas Mixtures

It was found that up to 30% of an 850 B.T.U. butane-air mixture could be used with a base gas of 47% carburetted water gas and 53% coke oven gas. There was a 3.8% burner input drop with this test gas. The limiting factor was due to the formation of luminous tips on the conversion type water heater.

Butane-Air and Carburetted Water Gas

Tests made with an 850 B.T.U. butane-air mixture and carburetted water gas, showed up to 31% could be used in the test gas. Above this point, luminous tips were obtained on the conversion type water heater burner. The luminous flame burner showed no sign of trouble due to lifting or slow lighting. The burner input was 1.9% lower than that obtained with the base gas.

With a 750 B.T.U. butane-air mixture the burner input dropped 11.5%. This mixture could be used up to 35% before trouble was encountered due to poor ignition and lifting or blowing off of the flames from the oven burner.

In first using LP gases mixed with air to supplement base load equipment and for peak load shaving, the heating value and specific gravity of the sendout gas will rise to levels considerably above those previously experienced. The base load gas, however, will have to be kept at the heating value used when the limits of interchangeability were determined, otherwise appliance input ratings will not be properly maintained. The thermocouple type safety pilots on our newer appliances react unfavorably to reduced inputs.

The luminous flame burner and loop type oven burner were found to be critical in regard to slow ignition when the limit of interchangeability is approached.

In general, the appearance of the flames and the quietness of operation is improved when LP gas is mixed with either coke oven or carburetted water gas.

If the LP gas to be used for the first time is introduced in a low concentration in the sendout gas, the borderline appliances having lint-clogged primary-air shutters or abnormal input settings will not cause service calls to reach alarming proportions.

Presented at the Operating Division Meeting, New England Gas Association, Boston, January 17th, 1946.

LP - AIR - Manufactured Gas Mixtures

By
David W. Price
Engineer
The Connecticut Light and Power Co.
Waterbury, Connecticut

THE SPOTLIGHT of interest in the gas industry is currently focused on the us of LP gas in its production processes. The opinions and action may be classified under two heads: pyrolysis with resulting chemical reformation, and mixed or undiluted use of the raw material directly in the gas stream. The former is being actively practiced in our Waterbury Plant pursuant to initial experiments by Mr. H. M. Kopp of our company, and the results are a matter of record and worthy of continued attention and research. It is the purpose of this paper to make available data on the latter consideration — practical information gained to date from the initial steps in an actual test and research program designed to establish the limitations which must be recognized to meet service requirements in any application of LP gas mixing.

The mixing of LP gases, air diluted or not, with base gases such as carburetted water gas or coke oven gas, is attractive because of the low investment, low producing cost and simplicity of operation attendant to the process. Aside from the economic aspects relating to plant investment and producing costs, relation between base and peak demands, quantities of gases available at different seasons of the year, location with respect to source of supply, reliability of supply and others, there is the exceedingly important requirement of utilization in the appliances. If good service conditions are to be maintained and readjustment of appliances avoided in changing from one gas to another, definite limits governing variations in heating value, specific gravity and chemical composition must not be exceeded.

The essential data accumulated to date deals with the interchange of carburetted water gas with propane-air mixtures when used to mix with, or replace the base carburetted water gas on which appliance adjustment has been made.

Propane, with a tested heat value of 2,422 Btu and 1.35 specific gravity, was used and metered mixtures produced in a 40 cubic foot gasometer provided with a motor-driven mixing device for rapid diffusion of the blended gases. The carburetted water gas used was one of normal chemical constituency, specific gravity and a heat value of 530 Btu.

A group of appliances regularly supplied and adjusted for carburetted water gas were used in the tests. They were selected as representing the complete range of types from old to modern, including both luminous and blue flame burners.

It should be understood that a great number of observations were made involving considerable judgment of test results to decide whether or not the performance of appliance burners on a given mixture was satisfactory. Interpretations are thus rendered susceptible to varying conclusions and are admissible of proof, except within the tolerances generally conceded to be possible in field practice. Such condition then must be accepted since field practice does not permit determinations of the absolute and definite dividing line between satisfactory and unsatisfactory burner performance. The results further reflect our own situation, independent of that of other companies, and are related to the number and type of burners prevalent on our system. We believe they are conservative enough to be usable for immediate practical application.

The adjoining graph sheet depicts the characteristics of propane-air-carburetted water gas mixtures and indicates the important facts disclosed. It was not deemed practical to supply all detailed data collected during our tests, but rather to present a summary of the broad conclusions reached.

1. It appears advisable to select a propane-air mixture of a Btu content which provides constant thermal input and equal to the base gas input for any given gas pressure. In our case this is a mixture of 695 Btu.

Deviations above or below this heat value will cause increased or decreased thermal inputs respectively. Decreased thermal inputs may be desired because of economy, but should not be lowered to a point which will impair service. If thermal inputs are kept constant and equal to those obtained on the base gas, then satisfactory appliance performance is retained from the standpoint of heat requirements, and leaves us to deal only with the question of combustion characteristics.

2. The limits to which the 695 Btu propane-air mixture may be used to mix with carburetted water gas, and still retain satisfactory combustion characteristics are shown for complete interchange embodying frequent demands or demands of long duration during which time appliances may be adjusted or installed on the limiting mixture and the sendout gas subsequently reverted back to the base gas. They are also shown for short or infrequent demands during which time there is no likelihood of adjustments being made on the limiting mixture. Luminous flame burners are not included in this latter category because they either will or will not tolerate the limiting mixture and because the flames are non-aerated and not subject to primary air premixing.

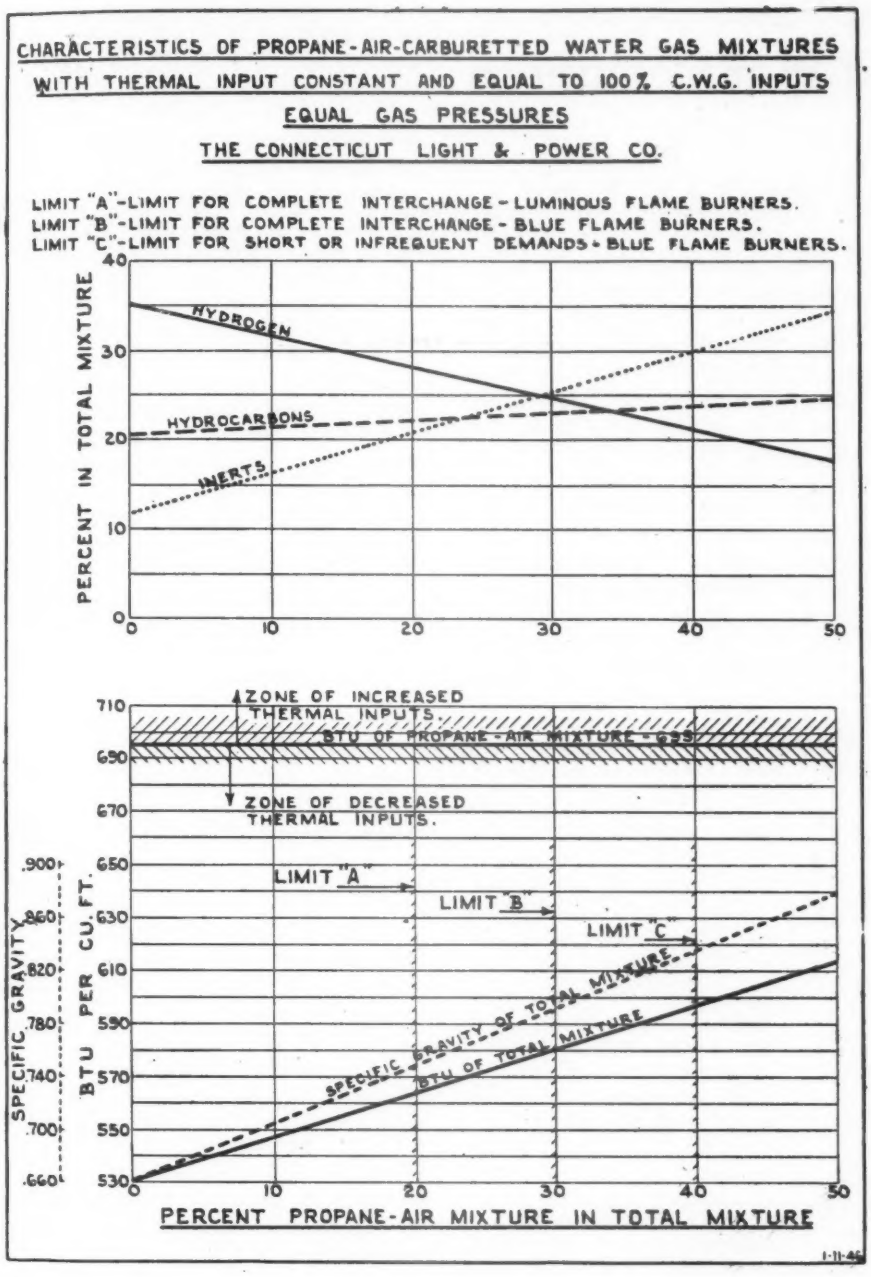
3. Limit "A"—Limit for complete interchange on luminous flame burners is shown to be 20% of the propane-air mixture in the total mixture or an increase in the base gas volume of 25%.

We wish to point out that with a few exceptions, this low limit of interchangeability on luminous flame burners can be increased to be equal to or higher than the limit on blue flame burners by using a port spacing not greater than ¼" and port sizes not smaller than No. 68 drill size. It may be advisable to consider such changes on burners in the field to permit the higher limits of mixing. The answer will be found in a study of the economics involved and should be favorable because of the relatively low number of such burners usually found in use. We, however, have a large number of luminous flame burners with wide port spacing and port sizes of under No. 70 drill size.

We propose to apply further study to this subject, because it is felt that luminous flame burners offer too many advantages from the standpoint of general customer acceptance and satisfaction to have any obstacle placed in the way of their future development.

4. Limit "B"—Limit for complete interchange on blue flame burners is shown to be 30% of the propane-air mixture in the total mixture or an increase in the base gas volume of 42.8%.

5. Limit "C"—Limit for infrequent demands is shown to be 40%


CHARACTERISTICS OF PROPANE-AIR-CARBURETTED WATER GAS MIXTURES
WITH THERMAL INPUT CONSTANT AND EQUAL TO 100% C.W.G. INPUTS
EQUAL GAS PRESSURES
THE CONNECTICUT LIGHT & POWER CO.
LIMIT "A"-LIMIT FOR COMPLETE INTERCHANGE - LUMINOUS FLAME BURNERS.
LIMIT "B"-LIMIT FOR COMPLETE INTERCHANGE - BLUE FLAME BURNERS.
LIMIT "C"-LIMIT FOR SHORT OR INFREQUENT DEMANDS - BLUE FLAME BURNERS.
PERCENT IN TOTAL MIXTURE
HYDROGEN
HYDROCARBONS
INERTS
ZONE OF INCREASED THERMAL INPUTS.
BTU OF PROPANE-AIR MIXTURE = 695
ZONE OF DECREASED THERMAL INPUTS.
LIMIT "A"
LIMIT "B"
LIMIT "C"
SPECIFIC GRAVITY
BTU PER CU. FT.
SPECIFIC GRAVITY OF TOTAL MIXTURE
BTU OF TOTAL MIXTURE
PERCENT PROPANE-AIR MIXTURE IN TOTAL MIXTURE
1-11-46

of the propane-air mixture in the total mixture or an increase in the base gas volume of 66.6%.

6. Chemical composition plays the most important, if not the controlling factor, in establishing the permissible limitations.

Changes in chemical composition leading to a reduction in ignition velocity first affects luminous flame burners and evidences itself by lifting of the flame and refusal of the flames to propagate from port to port. As previously stated, closer spacing and larger ports will greatly relieve the condition, but care must be taken to prevent tendency toward incomplete combustion or the emission of sooty particles by port sizes of too large a size. Blue flame burners are likewise affected but will tolerate generally lower ignition velocities than luminous flame burners.

It is believed that the free hydrogen and inert content of the base gas form a criterion of limits of mixing. The curves show that Limit "B" coincides with the point of crossing or point of equal percentages of the free hydrogen and inert content in the mixed gases. We noted distinct evidence of departure from good combustion characteristics when the inert content of the total mixture begins to exceed the free hydrogen content. Again this is primarily true of blue flame burners but not necessarily true of luminous flame burners, where the latter involve high jet velocities because of the small ports generally used, and the problem is more closely allied to the physical effect of low flame speeds.

It can be assumed therefore, that base gases with higher free hydrogen content than that in carburetted water gas will permit higher limits of mixing.

7. It is believed essential that each gas company investigating the possible use of LP-air mixtures make a careful study of its own local situation, irrespective of the conclusions of other companies, especially if appliances of any outstanding unusual nature exist on their system.

8. We have found no straight propane-air gas mixture to be interchangeable with or that can replace carburetted water gas, without appliance readjustment, replacement or rebuilding.

9. The foregoing test results we believe serve a pattern for future investigation. Since it is significant that other base gases may allow wider limits of mixing and minor appliance changes may serve the same purpose, we are planning to continue our research work with mixtures of LP gas and coke oven gas, blue gas, producer gas, hydrogen, inert free gases and others, in single or multiple mixtures. It is our expectation that disclosure of important information will result.

10. We urge that all companies develop similar investigational work and shape and make available their own conclusions in the interest of assured progress of this important subject.

The writer gratefully acknowledges the valued support of Mr. J. R. Beccia, Assistant Engineer and Mr. F. J. LaFleur, Chemist, in the procurement of the data herein presented.

Presented at N.E.G.A. Operating Division Meeting, Hotel Statler, Boston, Mass., January 17, 1946.

Change in Date for A.G.A. Conference

The A.G.A. Conference on Industrial and Commercial Gas originally scheduled in Toledo for Thursday and Friday, March 28 and 29, has been moved one day to Friday and Saturday, March 29 and 30. It will be held at the same location, the Commodore Perry Hotel.

A full program has been prepared for the two day conference which will include informative addresses and papers on: Prepared Atmospheres, LP Gas Standby, Heating for Plastics Processing, Commercial Water Heaters and Boilers, The Industrial and Commercial Gas Engineer's Opportunities, High Speed Direct Heating, and many others of vital interest to all gas men.

Revised Industrial Sales Course Adopted to Meet Post War Conditions

THE Southern California Gas Co. of Los Angeles has completed a comprehensive program along sales training lines designed to enable sales personnel to meet the changed conditions in the selling field which the transition from war- to peace-time operations brought about.

In this program the training of industrial gas salesmen has been given due attention. To obtain the story of what the company is doing to train industrial gas salesmen to meet the huge demand for industrial gas that will be made upon it beginning in 1946, when the new-factory construction program in the Los Angeles area is expected to be in full swing, this reporter interviewed R. C. Terradell, supervisor of sales training, for the firm.

The industrial gas load of the Southern California Gas Co. during wartime was actually larger than at the outbreak of hostilities. This was due to the demands for service from the numerous war plants, many of them entirely new, that operated in Southern California during the war years and increased demand for gas from existing plants which expanded for war production. As a result, the company's industrial gas department was one of its busiest divisions during the war and absorbed, on a temporary basis, considerable of the personnel from departments in which activity had decreased. The retransfer of personnel from temporary duty in the industrial department to former duties was started last September.

While a decrease in the demand for industrial gas took place in the months which immediately followed the close of the war due to the temporary closing for conversion of many plants, the industrial load of the company is expected to rebound to its wartime volume in 1946. Temporary postwar decline in the industrial gas load was caused, to some extent, by production cutbacks in aircraft and shipbuilding plants and in the smaller factories which supplied parts and tools to the larger producers.

Industrial Gas Load

The assumption that this utility's industrial gas load will ultimately return to practically the wartime volume is predicated on several factors. Among these is the fact that, during the war, innumerable small plants were established in the Los Angeles area which used industrial gas, some of these plants having no connection with the war effort. Many small plants which came into being as so-called "war babies" to produce airplane parts, tools and other items for war use, lost the mainstay of their existence when airplane and ship contracts were cut back.

While some of these specialty factories are expected to go out of business (some have already closed), quite a number are expected to go into production of other products and become permanent users of industrial gas.

How rapidly the Southern California Gas Co.'s industrial load will rebound to its wartime level, or how big the ultimate postwar load will be, depends on several things, it was pointed out: When and how quickly the many new factories for which plans have been announced can be built; how many of the existing small plants will stay in business and reconvert; when the reconversion will be completed; and how soon construction in general can move into high gear with ample materials for building and remodeling.

Personnel Training Program

While the personnel training program undertaken by the Southern California Gas Co. covers every conceivable need for sales training in the immediate postwar period, when many training problems of a temporary character will be encountered, the program as a whole has been designed with sufficient flexibility to enable it to be revised and amended for use as a permanent program for sales training in years to come.

The program does not concern itself solely with industrial sales department personnel but embraces a broad plan for training all types of sales personnel which has contact with the public.

The training of industrial gas salesmen has been allotted the attention in the program which the importance of that department in overall company sales operations warrants.

The company attacked the question of a training program as far back as November, 1944. Two types of training were considered and eventually were incorporated in the program. These are *basic* training and *advanced* training.

In the preliminary discussions which preceded the development of the program one of the objectives was to discover, by a study of job classifications, the common denominator which ran through each job classification in the sales department.

Once the company discovered the common denominator, it was in position to prepare a basic training course that would supply the needed information and aid those employees in certain techniques which each worker would find useful on his job. The firm, therefore, developed a basic training course, which was placed in operation shortly after the close of the war last fall.

Basic Training Explained

The basic training course is given to all existing as well as new employees of the sales department. As soon as a person is accepted for employment, he or she is enrolled in the indoctrination class. Indoctrination is the main objective of the basic training course. New employees are not permitted to engage in active work in their respective job classifications until they have completed the indoctrination course.

Classes are held eight hours a day, five days a week for two weeks. Following completion of the indoctrination course the new employees are assigned to the jobs and engage in their first work.

After a satisfactory basic training course, emphasizing the indoctrination principle, had been set up, the company's training staff turned its attention to the development of an advanced training program.

The objective of the advanced training program is to provide training material and courses which deal with the specific duties of the various job classifications within the sales department. This advanced training is given concurrently with activity on the job.

Specific Job Training Given

A dozen or more courses, designed to supply specific training for job classifications, are available in the ad-

vanced training schedule, including the following job classifications:

Industrial plant gas salesmen

Salesmen who contact hotels and restaurants

Architect and builder contact men

Dealer representatives

Domestic gas sales and appliance representatives

Appliance consultants

New-construction salesmen

Sales department clerical personnel, to ground them for duty in the sales department.

Main extension representatives.

While all new employees of the sales department undergo basic training, only the course which applies directly to a worker's specific job classification must be taken in the advanced program. For instance, salesmen occupied exclusively with the sale of industrial gas to factories must take the advanced course prepared for "Industrial Plant Gas Salesmen," but are not required to attend classes for "Architect and Builder Contact Men," or the other classification courses. The curriculum for each class has been prepared to meet the specific needs of the various types of jobs.

Training Industrial Gas Salesmen

The advanced training course for industrial plant gas salesmen is aimed chiefly toward thorough indoctrination over and above that provided in the basic training program. The company takes the position that selling industrial gas requires practical as well as technical knowledge. All its industrial gas salesmen must be competent engineers in gas technology and no attempt is made in the training classes to touch upon the highly technical and engineering phases of their job.

Since the Southern California Gas Company's sales training program was still in process of development as this article was written (December), more complete details cannot be presented at this time. However, the nature of the project, as disclosed by a review of a topical outline, indicates it will be a detailed, comprehensive sales training effort for a permanent training program which can easily be amended and modernized to meet changing conditions in the years to come.

This organization is staffed and equipped to design, fabricate and erect any kind of tank you want—anywhere you want it. This includes dry seal gas holders, condensers, rectifying towers, butadiene storage, gasoline storage, accumulators—the complete list includes well over 300 different kinds of tanks!

When you ask Stacey Brothers to bid on a tank you may be surprised to find unusual recommendations regarding design and construction features. You will profit from these innovations in terms of weight reduction, longer tank life and lower initial cost.

Our bid won't cost you a cent; it may save you thousands of dollars. Why not give us the opportunity . . .

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One of the Dresser Industries

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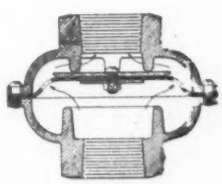
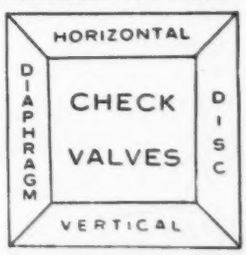
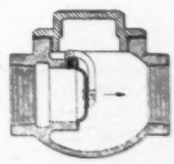
ANY PRACTICAL SIZE OR SHAPE OF TANK. This Stacey-Klonne type dry seal gas holder has a ten million cubic foot capacity. In this design a "piston", with a patented mechanical seal, moves up or down in the shell as gas volume increases or decreases

Pressure Controls for Gas and Air







NORWALK VALVE COMPANY

35 Railroad Ave. South Norwalk, Conn.

Operating Division N. E. G. A. Holds Meeting

THE operating division of the New England Gas Association held an afternoon and evening meeting at the Statler Hotel, Boston, Jan. 17th. Attendance 170.

The first paper presented was "LP-Air and Manufactured Gas Mixtures" by Warren E. Churchill, Chief Chemist, Boston Consolidated Gas Co. in which he discussed tests made on appliances known to be critical in their operation on gases of varying compositions. He was followed by David W. Price, Engineer, The Connecticut Light and Power Co., Waterbury. Mr. Price discussed performance characteristics of propane-air and carburetted water gas mixtures. Both papers are printed in this issue of the JOURNAL.

John E. Huston, Industrial Engineer, The Bridgeport Gas Light Co. prepared a paper titled "Industrial Load Developments During the War," Mr. Huston said in part: "We were faced with a 564% increase in industrial load between 1938 and 1943. Industrial sales became almost 50% of our total sendout.

"Around 1938 additional gas generating equipment was purchased which was to take care of normal expansion over the next eighteen to twenty years. This increased the generating capacity of the plant by 50%. However, this generating capacity was almost immediately absorbed by war industries when it was installed in late 1941.

"Not only where we obliged to supply this tremendous increase but there was an influx of from sixty to eighty thousand people. (Bridgeport proper in 1940 had a population of 147,121).

"Our distribution system at two points was unable to take care of two large war-increased plants. At one location what gas load we did have has now shrunk by three-fourths and there is a possibility that the customer will now move out-of-town. The other customer installed propane in 1944 which represented a loss of 2,000,000 cubic feet per month. This customer may now sell his plant and consolidate at a location where we will have no great difficulty in supplying him.

"The desirability of the industrial load has sometimes been questioned. It has the best load factor of any load, a rather obvious statement but sometimes overlooked. On maximum days it is no embarrassment such as the house heating load may be. It gets practically no service other than the industrial engineer can take care of.

"The question may be asked as to the inroads that competition may make into our industrial load. Our answer to that is that no New England Gas Company's Industrial Department was ever over-manned. Anytime that we want to increase, or perhaps even hold our industrial load, all we have to do is follow to some degree the policy of sales coverage that is given the domestic business and the service policy that is usually given the restaurant business."

H. E. White, Vice President, The Bridgeport Gas Light Co. told the story of how their large industrial load started. Mr. White said: "Our story begins with a foreman in the Annealing Department of a brass company in the year 1931. For years this man had a headache due to pickling and washing the brass shapes preparatory to the next draw. It was expensive, it was sloppy, and it ought not to be necessary to do it, but it was necessary. He had made several unsuccessful attempts to avoid pickling and had failed. Yet the idea prevailed—it ought not to be necessary. He thought about the question most of the time. He told his story to a sympathetic superior, who advised him not to go to the front office and ask for an appropriation to carry on some experiments,—due to the depression he probably would lose his job.

"Excursions around the factory showed there was plenty of equipment that wasn't being used. He listed what he needed and obtained permission to assemble the pieces—a motor, a steel chain conveyor, a few tanks, some scrap steel plates—that the maintenance men could make into needed accessories. This was a slow process. Finally he had everything needed except a furnace. He heard that a company in a neighboring city had sold an old furnace to a junk man. He visited the junk dealer, found the furnace, and then pleaded with his company to buy it as scrap iron. All this time he good-naturedly took the razzing of his associates, and all this time he was in close contact with our Industrial Gas Engineer. At last the day for lighting the furnace arrived. A laboratory man was present to take samples of atmospheres. When heat was up a small amount of material was put in the furnace. Result very disappointing, it came out black as a black derby hat.

"The furnace was shut off. The lab reported too much air. Some canvas was obtained and made into a baffle at outlet of furnace. Second trial, a little better but not much. Furnace shut down and a second baffle put at outlet of furnace. Third trial, a little better. No more baffles at outlet of furnace could be used. The inlet of furnace was too hot to use canvas, so a piece of asbestos cloth with wire woven into it was found for inlet of furnace. Fourth trial, very much better, but not good enough.

"In these four tests the atmosphere was produced from the gas used to heat the furnace. It was decided there wasn't enough products of combustion. Provision had been made for burning additional gas if necessary. This special burner was lighted and the fifth test started. Results satisfactory. The foreman let out a war whoop, ordered all junk laying around to be removed, and asked for material to be annealed to be brought in. It was, and the furnace ran for about two months, with very little attention and giving very satisfactory results.

"Then it went dead. Examination showed a drip on the line that had had no attention had filled up. It was emptied and the furnace was again in operation. Having proved it could be done, when a new mill was built in 1938 annealing equipment that required 52 MCF of gas per hour for starting load and 26 MCF for running load was installed. As time went on many oil furnaces were changed to use gas until we had to say we had reached our limit."

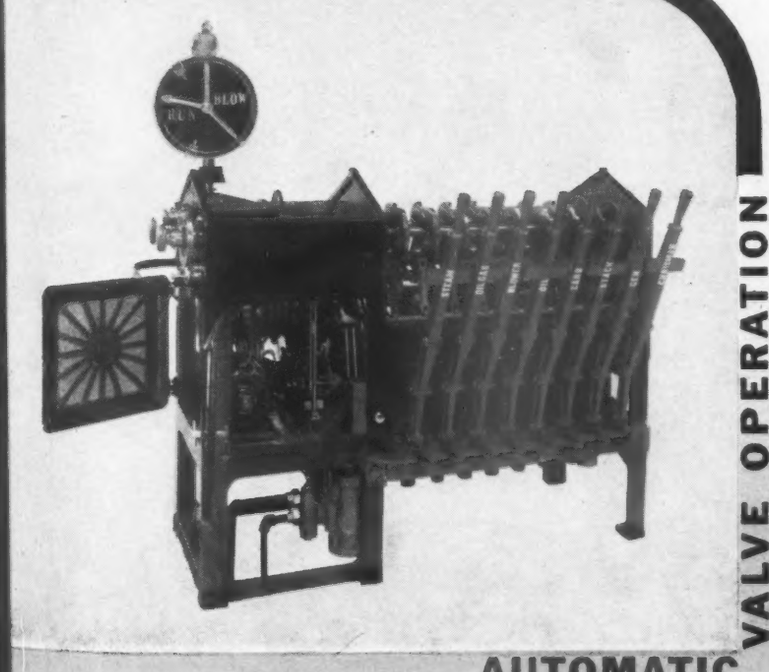
C. S. Goldsmith, Engineer of Distribution, Brooklyn Union Gas Co.,

(Concluded on page 54)

UGI Equipment

FULLY AUTOMATIC WATER-GAS PROD

The automatic generator with the automatic fuel-charger and automatic control machine provides a fully automatically operated water-gas set of high capacity and efficiency, requiring a minimum of labor, and making it possible to adhere more exactly to optimum operating conditions and cycles.

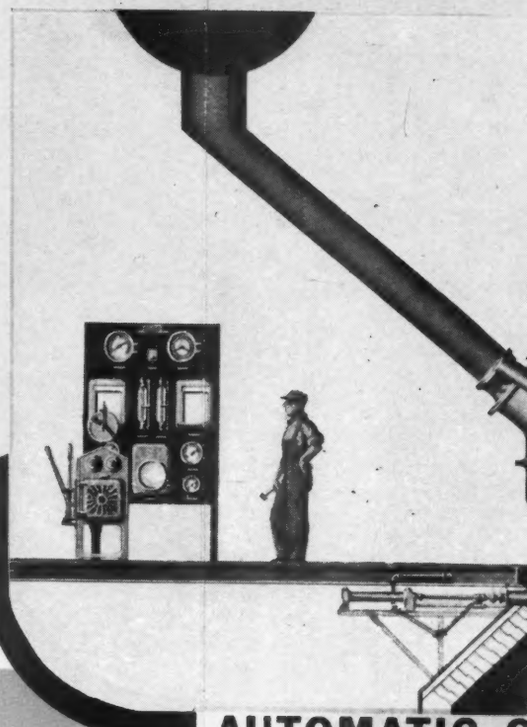


AUTOMATIC VALVE OPERATION

UNITED ENGINEERS &

(63 YEARS' EXPERIENCE IN GAS-PLANT DES

PRODUCTION



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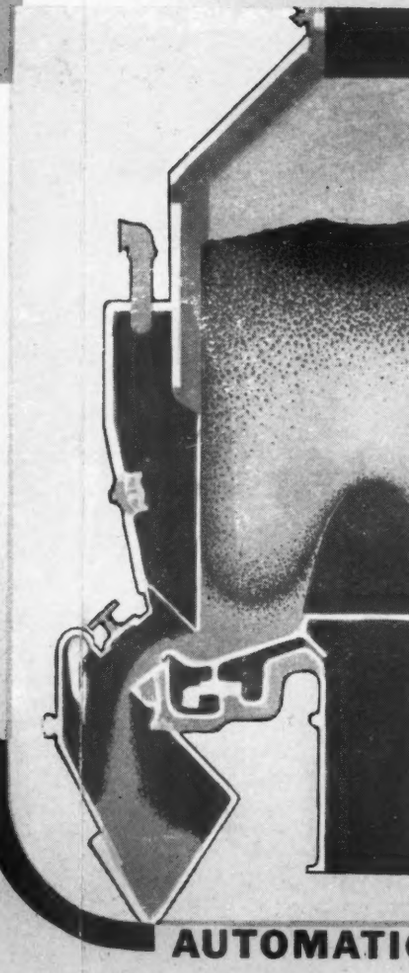

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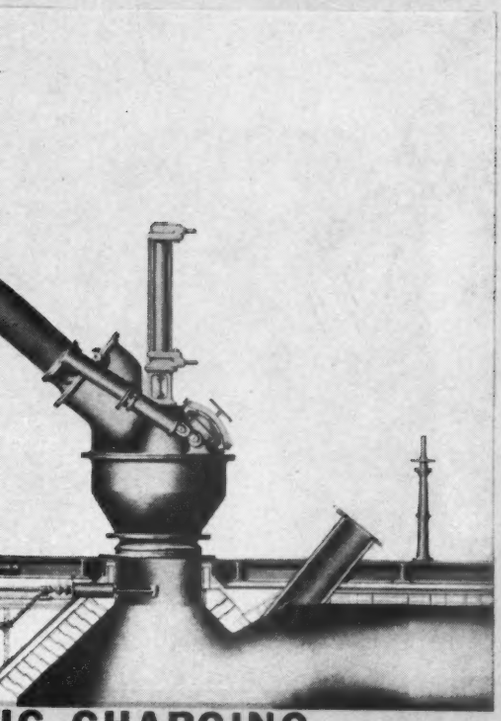

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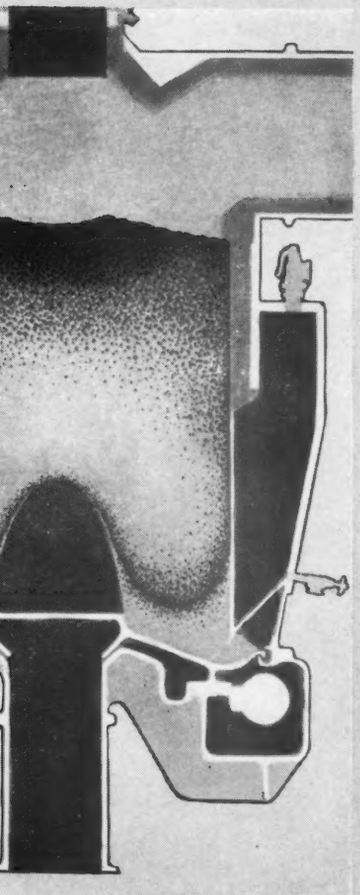

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Large Volume Water Heating

A series of articles for the Engineer, the Architect, the Salesman and the Contractor.

They show how to select and install correct types of Water Heater Systems for specific purposes.

By

Malcolm B. Mackay

The Burkay Company

CHAPTER II

Gas Fired, Recovery Water Heaters

There are approximately six (6) types of Gas Fired Water Heaters, Water Heating Boilers designed specifically for Gas Combustion and other boilers, both steel and cast-iron sectional, having combustion chambers the size and design of which are suitable for the installation of Gas Burners, which may be employed as recovery type water heating units in connection with separate, hot water storage tanks. All of these basic types are adapted to functioning in recovery type water heating systems employing Thermo-Syphon, or so-called gravity, circulation in the recovery circulating lines between the heater or boiler and hot water storage tank with the exception of the Burkay, gas-fired water heater. As the engineering design of the Burkay water heater employs the counter-flow principle to improve thermal efficiency and eliminate condensation from within the heater, the recovery circulation between the Burkay heater and the hot water storage tank *must* be accelerated by means of a circulating pump.

In the Burkay heater the cold water enters the heater near the *top*, passes first to the Finned Heat Exchanger above the combustion chamber, continues *downward* through copper coils forming the combustion chamber where it is heated further and also serves to cool or insulate the combustion chamber, and then is discharged, hot, at the base of the heater.

(b) Multi-Coil, Gas Fired, Recovery Water Heater.

In the conventional type of Multi-Coil, gas-fired, recovery water heater the heat of the gas flame, which impinges on the water carrying copper tubing of the heating coils, is transmitted by direct conduction to the water flowing through the coils. As indicated by the descriptive name of this type of heater, the Multiple, relatively short copper heating coils—which may be designed for installation in a horizontal or vertical position—are manifolded at each end to a header or manifold. The uppermost end of the manifold, connected to the upper ends of the coils, is connected, by means of the hot, discharge, recovery, circulating water line to the *upper* zone of the hot water storage tank. The lower end of the manifold, connected to the lower ends of the coils, is connected to the *bottom* of the hot water storage tank by means of the return, recovery, water circulating line.

The frictional resistance to the movement of the water, as it is heated, is materially less through the manifolded, multiple, shorter coils than would be the case if the heating coil were longer and continuous.

While the conventional type of recovery water heating system employs gravity circulation to accomplish movement of the heated water from the top of the heater to the upper zone of the hot water storage tank and the cooler water from the lower part of the storage tank to the base of the heater, a circulating pump may be employed to accelerate the rate of movement or circulation.

Where the recovery circulating lines between the heater and hot water storage tank are under sized or an excessive number of elbows and other fittings are employed, the frictional resistance to this water flow may be retarded to the extent that the resulting diminishment in the Rate of Displacement of the water in the heater would result in the water being heated to excessively high temperature before being delivered to the hot water storage tank.

Acceleration of the recovery circulation, by means of a circulating pump installed in the return, recovery circulating line and controlled by an Aquastat installed in the hot water storage tank, would, as the result of of increasing the rate of displacement of the water in the heater and the storage tank, achieve reduction in the temperature of the hot water delivered to the storage tank, greater uniformity of hot water temperature both in the tank and in that delivered to the fixtures and materially improve the efficiency of the system. It is also possible that the rate of deposition of lime or other scale in the heater and hot, discharge, recovery circulating line and fittings would be retarded as the water does not reach the excessive temperatures at which the deposit of lime or other scale is accelerated when it is mechanically circulated.

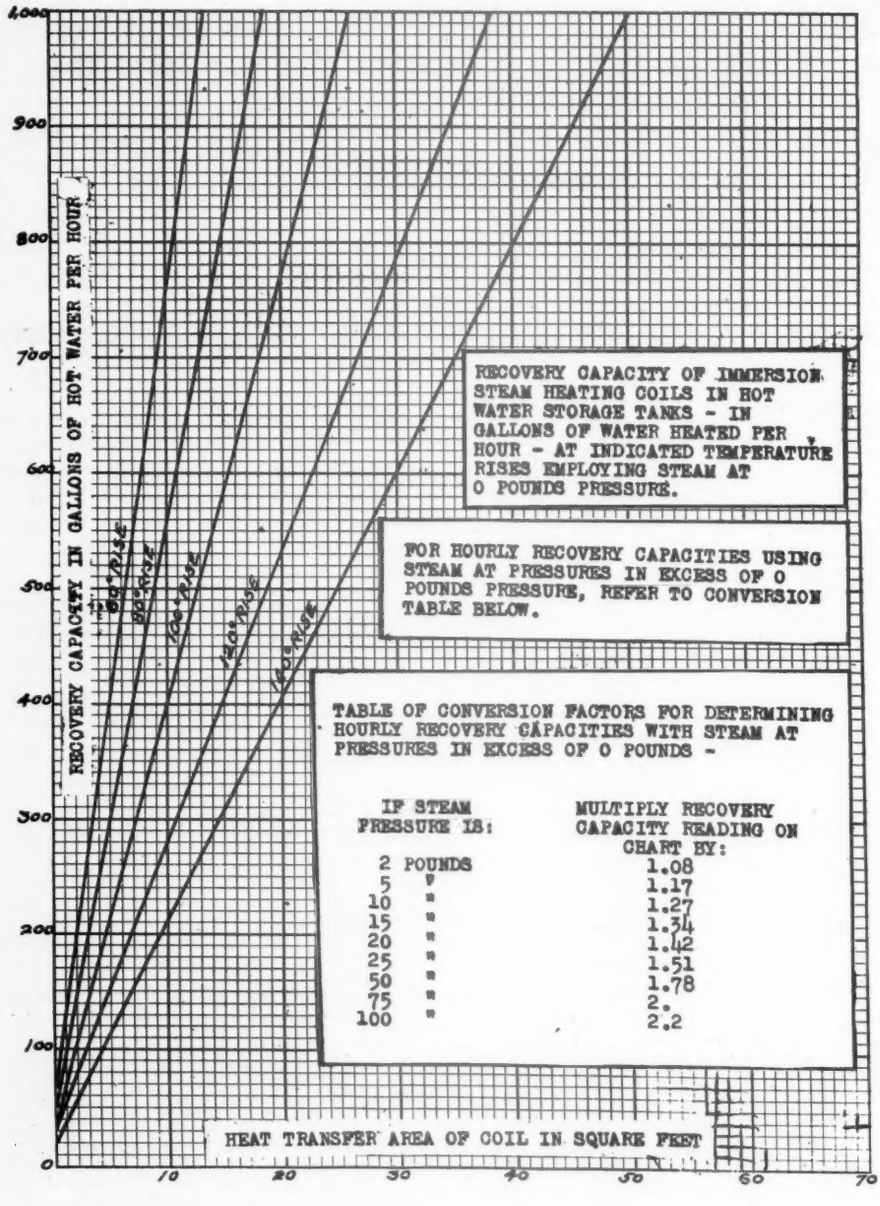
Control of the water temperature in this type of system is accomplished by means of a so-called Moment, Gas Valve installed in the hot water storage tank and through which the gas supply to the burner of the heater is piped. This moment valve is, basically, a snap-acting, adjustable immersion type Thermostat.

Upon a *rise* in the water in the hot water storage tank to the selected, pre-determined temperature, the bimetallic thermal element, immersed in the water in the tank, expands and, through mechanical linkage, *closes* the gas valve in the unit, *shutting-off* the gas supply to the main burner in the heater.

Upon a *drop* in the temperature of the water in the storage tank, the reverse cycle occurs and the resulting contraction of the thermal element serves to *open* the valve permitting gas to flow to the main burner where it is ignited by the constant burning pilot flame.

These moment valves usually operate on a temperature differential of approximately 15°F., i.e., if set to *shut-off* the gas to the main burner when the temperature of the water in the hot water storage tank reaches

FIGURE 2


RECOVERY CAPACITY IN GALLONS OF HOT WATER PER HOUR
RECOVERY CAPACITY OF IMMERSION STEAM HEATING COILS IN HOT WATER STORAGE TANKS - IN GALLONS OF WATER HEATED PER HOUR - AT INDICATED TEMPERATURE RISES EMPLOYING STEAM AT 0 POUNDS PRESSURE.
FOR HOURLY RECOVERY CAPACITIES USING STEAM AT PRESSURES IN EXCESS OF 0 POUNDS PRESSURE, REFER TO CONVERSION TABLE BELOW.
TABLE OF CONVERSION FACTORS FOR DETERMINING HOURLY RECOVERY CAPACITIES WITH STEAM AT PRESSURES IN EXCESS OF 0 POUNDS -
IF STEAM PRESSURE IS: MULTIPLY RECOVERY CAPACITY READING ON CHART BY:
2 POUNDS 1.08
5 " 1.17
10 " 1.27
15 " 1.34
20 " 1.42
25 " 1.51
50 " 1.78
75 " 2.
100 " 2.2
HEAT TRANSFER AREA OF COIL IN SQUARE FEET
0
100
200
300
400
500
600
700
800
900
1000
10
20
30
40
50
60
70

140°F., they will re-act to *open* the valve when the temperature of the stored water drops to 125°F.

Where a circulating pump is employed to accelerate the recovery circulation between a recovery type of water heater and the hot water storage tank, the bulb of the direct acting, immersion aquastat controlling the pump motor should *likewise* be immersed in the hot water storage tank at a level preferably mid-way between the center line and bottom of the tank and should be so adjusted that its functioning will be coordinated with that of the thermostatically actuated water temperature control unit i.e., to *start* and/or *stop* the pump coincidentally with the starting or stopping of a recovery heating cycle.

The pilot gas supply is taken off the moment valve or thermostatic control at a point *ahead* of the gas valve in the moment valve. Where the pilot is of the safety type, extinguishment of the pilot flame will result in preventing the admission of gas to the main burner of the heater.

Capacity. The recovery capacity of the gas-fired, multi-coil type of recovery water heater—in gallons of water raised a *given* number of degrees, F., *per hour*—is, in common with other gas-fired, recovery water heaters, directly proportional to the *rate*—in Btu.'s, per hour—at which the gas fuel is consumed by the main burner.

To determine the recovery capacity of gas-fired, recovery water heaters, refer to Figure 1.* This capacity chart shows the number of gallons of hot water which can be recovered, or heated, per hour, at seven different levels of water temperature rise. For details covering the application of this type of water heating system to various types of services and hot water demand, refer to Chapter III, to follow.

For installation diagrams and directions for installing gas-fired, multi-coil, recovery water heaters refer to Chapter IV, Section 4, which will follow.

Burkay, Gas-Fired, Water Heaters

In the Burkay type, the heat of the gas flame is transmitted to the water flowing through the finned heat exchanger by convection, i.e., there is no direct impingement of the gas flame upon any of the surfaces of the heating element. Due to the high ratio of heat transfer area of the copper heat exchanger to the water content, both the rate of heat absorption and the heat absorption capacity exceed that of a heating coil having only prime surface.

The Burkay heater, being designed to operate on the counter-flow or down-flow principle, the heated water is discharged at the *base* of the heater while the cold water enters the heater near its *top*. This reversal of the direction of flow through the heater necessitates the employment of a standard type of circulating pump in the return water line between the heater and the hot water storage tank when this heater is employed in a recovery water heating system or in a two temperature—recovery *and* booster— water heating system (See Chapter IV, Sections 4 and 6 to follow.

Control of Water Temperature. Control of the temperature of the hot water discharged from the heater is accomplished by means of a thermostatic control unit which is installed in the heater and also incorporates a thermostatic pilot control of the safety type which serves to lock the main gas valve of the thermostat in a *closed* position in the event of pilot failure or pilot flame extinguishment.

This thermostatic, water temperature control not only serves to open and close the main gas valve in the thermostat upon starting or stopping of water flow through the heater, but also to *modulate* the gas supply to the burner so that gas is continuously supplied in direct proportion to the load—rate and/or volume of water flowing through the heater.

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* *See January issue, page 40.—Ed.*

The thermal element is of the bi-metallic type immersed in a water way in the heat exchanger. Expansion of the thermal element—upon a rise in the temperature of the flowing water to a selective, pre-determined degree—serves, through mechanical linkage, to shut-off or restrict the flow of gas to the main burner as may be required. Upon a drop in the temperature of the water flowing through the heater, the resultant contraction of the thermal element serves to open the gas valve in the thermostat and supply gas to the main burner at the rate required to heat the water flow to the desired, pre-determined temperature.

A Safety Gas Shut-Off Valve is also supplied for installation in the gas supply line at a point close to the water inlet of the heater. Upon attainment of *too high* a water temperature or upon failure of the thermostatic or the safety pilot control to shut-off the gas supply to the main burner, the softening or fusing of a metallic alloy in the bulb of the safety shut-off permits this valve to close and shut-off the *entire* gas supply. The closed safety gas shut-off valve may be manually re-set after permitting the heater to cool—correcting the trouble which resulted in over-heating and re-lighting the pilot. The Circulating Pump is employed to accelerate the recovery circulation between the water heater and the hot water storage tank. The bulb of the direct acting, immersion aquastat controlling the pump motor should be immersed in the water in the hot water storage tank at a level preferably mid-way between the center line and bottom of the tank.

Capacity. The recovery capacity of this heater—in gallons of water raised a given number of degrees F., in one hour—is, in common with other gas-fired heaters, directly proportional to the rate—in B.T.U.'s per hour—at which the gas fuel may be delivered to, and consumed by the Burner.

Gas Fired Water Heating Boilers

The conventional direct Gas-Fired Water Heating Boiler is similar to a Coal-Fired Boiler of the same type in practically all respects except that, in the case of the gas-fired boiler, the combustion chamber space is materially reduced to a size which will accommodate the gas-burners for which the combustion chamber is designed. Gas-burners are so located that, although the gas flame does not impinge upon, or come in contact with the water carrying parts, the intervening space is reduced to the minimum where such impingement will not occur in order that the maximum amount of radiant heat from the flame may be utilized.

The heat of the gas flame and of the convection currents of the hot gases is transmitted by conduction through the walls of the combustion chamber and the flue gas passages in the boiler to the water in the jacket of the boiler surrounding the combustion chamber and flue-gas passages.

The water in the boiler jacket, when heated, rises and flows to the upper zone of the hot water storage tank through the hot, discharge, recovery, circulating water line connected to a tapping, or tappings, in the uppermost part of the boiler shell and is displaced by cooler water from the lower zone of the hot water storage tank through the return, recovery water circulating line connected to a tapping, or manifolded to two tappings in the boiler at the lowest level of the water jacket.

While the conventional type of recovery water heating system employs thermo-syphon or so-called gravity circulation to accomplish movement of the heated water from the top of the heater to the upper zone of the hot water storage tank and the cooler water from the lower part of the storage tank to the base of the heater, a circulating pump may be employed to accelerate the rate of movement or circulation.

Where the recovery circulating lines between the heater and hot water storage tank are under sized or an excessive number of elbows are employed, the frictional resistance to this water flow may be retarded to the extent that the resulting diminishment in the rate of displacement of the water in the heater would result in the water being heated to excessively high temperature before being delivered to the hot water storage tank.

Acceleration of the recovery circulation, by means of a circulating pump installed in the return, recovery circulating line and controlled by an aquastat installed in the hot water storage tank, would, as the result of increasing the rate of displacement of the water in the heater and the storage tank, achieve reduction in the temperature of the hot water delivered to the storage tank, greater uniformity of hot water temperature both in the tank and in that delivered to the fixtures and materially improves the efficiency of the system. It is also possible that the rate of deposition of lime or other scale in the heater and hot, discharge, recovery circulating line and fittings would be retarded as the water does not reach the excessive temperatures at which the deposit of lime or other scale is accelerated when it is mechanically circulated.

Control of Water Temperature. Control of the water temperature in a recovery type water heating System employing a gas-fired, water heating boiler is accomplished by either of two methods.

When a so-called gas, moment valve or immersion thermostat is employed, the bulb or barrel of the thermal element is immersed in the water in the hot water storage tank at a point preferably mid-way between the center line and bottom of the storage tank.

Upon a *rise* in the water in the hot water storage tank to the selected, pre-determined temperature, the bi-metallic thermal element, immersed in the water in the tank, expands and, through mechanical linkage, *closes* the gas valve in the unit, shutting off the gas supply to the main burner in the boiler.

Upon a *drop* in the temperature of the water, the reverse cycle occurs and the resulting contraction of the thermal element serves to *open* the valve permitting gas to flow to the main burner where it is ignited by the constant burning pilot flame.

Where a line voltage, direct acting aquastat is employed to actuate a solenoid valve in the gas supply line to the main burner, the bulb of the aquastat, enclosing the bi-metallic thermal element, is likewise immersed in the water in the hot water storage tank at a level preferably mid-way between the center line and bottom of the tank.

Upon a *rise* in the water in the hot water storage tank to the selected, pre-determined temperature, the bi-metallic thermal element of the aquastat, immersed in the water in the tank, expands and breaks electrical contact in the aquastat opening the electrical circuit to de-energize the solenoid valve and cause the valve to shut off the gas to the main burner in the boiler. Upon a *drop* in the temperature of the water in the storage tank the reverse cycle occurs and the resulting contraction of the immersed thermal element serves to *make* electrical contact, closing the electrical circuit to energize the solenoid valve causing the valve to open and permit flow of gas to the main burner in the boiler.

Either the moment gas valve or the immersion aquastat usually operate on a temperature differential of approximately 15°F., i.e., if set to shut-off the gas supply to the main burner in the boiler when the temperature of the water in the storage tank reaches 140°F., they will re-act to open the valve and permit gas to flow to the main burner when the temperature of the stored hot water drops to 125°F. The Pilot gas supply is taken off at a point ahead of the main gas valve of the moment valve or the solenoid valve. Where the pilot is of the safety type, extinguishment of the pilot gas flame will result in preventing the opening of the moment gas valve or the solenoid gas valve and prevent admission of gas to the main burner of the boiler.

Where a circulating pump is employed to accelerate the recovery circulation between a recovery type of water heater and the hot water storage tank, the bulb of the direct acting, immersion aquastat controlling the pump motor should *likewise* be immersed in the water in the hot water storage tank at a level preferably mid-way between the center line and bottom of the tank and should be so adjusted that its functioning will be coordinated with that of the temperature control unit i.e., to start and/or stop the pump coincidentally with the starting or stopping of a recovery heating cycle.

NOTE. In numerous instances, recovery type water heating systems have been installed in which the thermostatic unit, controlling admission or shutting-off of the gas supply to the main burner in the boiler, has been located in the boiler rather than in the hot water storage tank.

This practice not only precludes the possibility of the system operating at the highest possible level of capacity but will result in a wide fluctuation in the temperature of the hot water delivered at the fixtures, particularly during periods of peak demand.

Located in the boiler, the thermostatic control unit can not be expected, nor *will not* accurately reflect rapid changes in the temperature of the hot water in the storage tank resulting from the draw-off of hot water and its displacement by cold water. In fact, a simultaneous demand for hot water from a multiple number of fixtures during a peak demand period may result in the stored reserve of hot water being drawn from the hot water storage tank at such a rapid rate that the reserve supply of hot water would be almost exhausted before the delayed drop in temperature of the water in the boiler would be sufficient to actuate the thermal element of the water temperature control unit and start to replenish the hot water reserve through resumption of operation of the gas burner. Should a peak hot water demand continue for a considerable time, it must accordingly be apparent that the temperature of the hot water delivered at the fixtures would drop perceptibly before a resumption of operation by the main gas burner in the boiler would start to replace the hot water drawn from the storage tank at a rapid rate.

Safety Protection. For description of approved types of Pressure and/or Temperature Relief Valves and instructions covering required capacity of such equipment, refer to CHAPTER V, Section 7, which will follow.

Capacity. The Recovery Capacity of a Gas-Fired Water Heating Boiler designed specifically for gas combustion—in gallons of water raised a given number of degrees, F., per hour—is directly proportional to the rate, in B.T.U.'s per hour, at which the gas fuel is delivered to, and consumed by the main burner. To determine the recovery capacity refer to Figure 1, Chapter 1.

For Installation Diagrams and directions for installing gas fired water heating boilers refer to Chapter IV, Section 4, to follow. For details covering the application of this type of water heating system to various types of service and hot water demand, refer to Chapter III, to follow.

Conventional, Coal-Fired Water Heating Boiler with Installed Gas Burner.

The Conventional Type of Coal-Fired Water Heater or Water Heating Boiler, either Vertical or Horizontal may be converted to gas combustion by the installation of a gas burner of adequate capacity and the necessary controls. The design and/or size and shape of the combustion chamber may, however, be such that the gas burner can not be located in a position where the heat transfer to the water carrying parts of the boiler would be as effective as would be the case in a boiler having a combustion chamber designed for the employment of gas combustion.

Control of the water temperature in a recovery type water heating system employing a water heating boiler converted to gas combustion may be accomplished by either of two methods. When an immersion type of snap-acting thermostat is employed, the barrel of the unit is immersed in the water in the hot water storage tank at a point preferably mid-way between the center line and bottom of the storage tank.

Upon a temperature rise or drop the controls act as described under gas water heaters.

Where a line voltage, direct acting aquastat is employed, the action is as described previously under "Controls."

Where a Circulating Pump is employed to accelerate the aquastat operates as previously described.

NOTE. For additional information covering the necessity of installing the water temperature, thermostatic control unit in the hot water storage tank rather than in the boiler, refer to previous text on that subject.

Capacity. The Recovery Efficiency of conventional coal-fired water heating boilers with conversion gas burners installed will not be equal to that of water heating boilers designed specifically for gas combustion. The recovery capacity—in gallons of water raised a given number of degrees, F., *per hour*—will likewise be directly proportional to the ***rate,*** in B.T.U.'s per hour, at which the gas is delivered to, and consumed by the burner in the boiler. To determine the *approximate* recovery capacity of a conventional water heating boiler equipped with a conversion gas burner refer to Figure 1, Chapter I. While this capacity chart shows the number of gallons of hot water which can be recovered, or heated, *per hour* at seven different levels of temperature rise by a gas designed water heating boiler operating at seventy per cent (70%) thermal efficiency as required by A.G.A., the recovery capacity of a conventional, coal-fired, water heating boiler equipped with a gas conversion burner may be presumed to *approach* if not equal the figures shown in the Capacity Chart, Figure 1. It is accordingly suggested that the capacity figures in this chart be discounted approximately ten per cent (10%) when computing the recovery capacity of a conventional, coal-fired water heating boiler with installed conversion gas burner. For details covering the application of this type of water heating system to various types of service and hot water demand, refer to Chapter III, to follow.

Directions covering the installation and adjustment of this type of water heating system, together with installation diagram will be found in Chapter IV which will follow.

FIGURE 3

RECOVERY CAPACITIES - IN GALLONS OF HOT WATER PER HOUR - OF VERTICAL, HAND FIRED, COAL WATER HEATERS OR WATER HEATING BOILERS WITH INDICATED DIAMETERS OF ROUND GRATES AT SPECIFIED WATER TEMPERATURE RISES AND SPECIFIED COAL BURNING RATES

Round Grate Diameter	Coal Burning Rate Per Sq. Ft. of Grate Area Lbs. Per Hour	Sq. Feet Of Grate Area	-Output- Available B.T.U.'s Per Hour	Recovery Rate In Gallons Per Hour		
				G.P.H. 60 Deg. Rise 500 B.T.U.'s Required Per. Gal.	G.P.H. 100 Deg. Rise 833 B.T.U.'s Required Per. Gal.	G.P.H. 120 Deg. Rise 999.6 B.T.U.'s Required Per. Gal.
8"	4	.35	9,076	18.15	11.	9.1
	5		11,344	22.7	13.7	11.3
	6		13,613	27.2	16.4	13.6
9"	4	.447	11,627	23.3	14.	11.6
	5		14,534	29.1	17.5	14.5
	6		17,441	34.9	21.	17.4
10"	4	.545	14,180	28.4	17.1	14.2
	5		17,726	35.5	21.4	17.7
	6		21,271	42.5	25.6	21.3
12"	4	.785	20,420	40.8	24.6	20.4
	5		25,526	51.1	30.1	25.5
	6		30,631	61.3	36.9	30.6
14"	4	1.013	26,348	52.7	31.7	26.4
	5		32,936	65.9	39.7	32.9
	6		39,523	79.1	47.6	39.5
15"	4	1.227	31,907	63.8	38.4	31.9
	5		39,884	79.8	48.	39.9
	6		47,861	95.7	57.7	47.9
16"	4	1.396	36,301	72.6	43.7	36.3
	5		45,377	90.8	54.7	45.4
	6		54,452	108.9	65.6	54.5
18"	4	1.767	45,945	91.9	55.4	45.9
	5		57,431	114.9	69.2	57.4
	6		68,917	137.9	83.1	68.9
20"	4	2.18	56,880	113.4	68.3	56.7
	5		70,850	141.7	85.4	70.9
	6		85,020	170.	102.4	85.
22"	4	2.41	62,530	125.1	75.3	62.5
	5		78,163	156.3	94.2	78.2
	6		93,795	187.6	113.	93.8
24"	4	3.142	81,682	163.4	98.4	81.7
	5		102,102	204.2	123.	102.1
	6		122,522	245.	147.6	122.5

* MAXIMUM RATE AT WHICH COAL CAN BE BURNED IN SMALL BOILER OR HEATER AND MAINTAIN A THERMAL EFFICIENCY OF 60% OR AN OVER-ALL EFFICIENCY OF 50%.

Direct Gas-Fired, Storage-Recovery Water Heater

Direct, Gas-Fired, Large Volume Water Heaters may be of either the Vertical type or the Horizontal type. This type of heater is basically similar to the gas-fired, automatic, storage water heater in that it is a self-contained unit. Being materially larger than the latter, both as to storage and recovery capacity, this type of water heater is capable of adequately supplying commercial or large volume hot water requirements either as a self-contained unit or as a recovery heater in conjunction with a separate, hot water storage tank.

In the self-contained, Vertical type, the heat of the gas flame is transmitted to the water in the heater by direct conduction through the bottom of the storage tank and the heat of the flue gases to the water by direct conduction through the walls of the multiple, vertical tubes or flues in the storage tank.

Baffles, usually of the spiral type, are frequently installed in the vertical flues or tubes to improve or increase the conductivity of the flue or tube surfaces.

In the Horizontal type a gas flame is fired directly into each of several horizontal tubes or flues in the hot water storage tank. While these are referred to as "Horizontal," they are pitched upward perceptibly from the firing end. This upward pitch serves both to induce the necessary draft for proper combustion of the gas and also to drain-off the inevitable condensed moisture developed in the flues or tubes. Provision is made for collecting this condensate and conducting it to a drain. The heat of the gas flames, which impinge upon the surface of the flues or tubes, and of

the hot flue gases is transmitted to the surrounding water by direct conduction through the walls of the tubes.

In either the Vertical or Horizontal type the flue gases will usually be found to be rather heavily saturated with moisture which may be responsible for corrosive action of the flue gases on the surfaces of iron or steel flues or flue-pipe being accelerated unless the metal is inhibited against such corrosion.

Controls. Thermostatic, Water Temperature Controls are usually of the Snap-acting, Bi-metallic Type as previously described.

These Thermostats normally operate on a temperature differential of approximately 15°F.

Safety Protection. For description of approved types of pressure and/or temperature relief valves, refer to Chapter IV, which will follow.

Operation As a Recovery Water Heating Unit.

When installed as a Recovery Water Heating Unit in conjunction with a separate, hot water storage tank to provide an increased reserve of heated water to meet excessive, peak, hot water demands, the thermostatic water temperature control *must* be so installed in the separate, hot water storage tank that the barrel of the thermostat is immersed in the water of the separate storage tank at a level preferably mid-way between the center line and bottom of the tank. If located in the tank of the heater, itself, the thermostatic control unit can not be expected to, nor *will not* accurately reflect *rapid* changes in the temperature of the hot water in the separate storage tank resulting from the draw-off of hot water and its displacement by cold water. In fact, a simultaneous demand for hot water from a multiple number of fixtures during a peak demand period may result in the stored reserve of hot water being drawn from the hot water storage tank at such a rapid rate that the reserve supply of hot water would be almost exhausted before the delayed drop in temperature of the water in the heater tank would be sufficient to actuate the thermal element of the water temperature control unit and start to replenish the hot reserve through resumption of operation of the gas burner.

Should a Peak Demand for hot water continue for a sufficiently long period, the temperature of the hot water delivered at the fixtures would drop perceptibly before a resumption of operation by the burner in the heater would start replacement.

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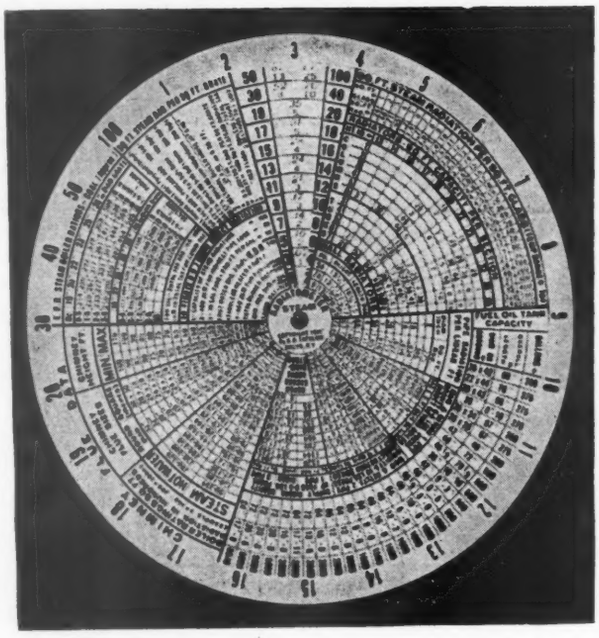

Direct readings appear on the Heat-O-meter, covering factors entering into all heating calculations.

The Heat-O-meter employs three concentric celluloid printed discs. Outside disc, 6¼" diameter, is printed in red on both sides. The inner discs are printed in black with a cut-out V sector.

It covers sizes of mains, returns, risers, radiator sizes and capacities, round and sectional boiler net ratings, chimney flue sizes, capacities and heights. Also hot water and fuel tank sizes and capacities, hot water generator capacities, etc.

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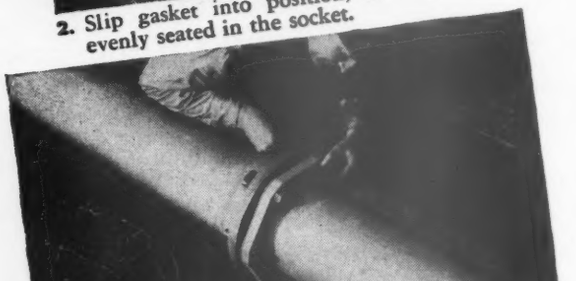
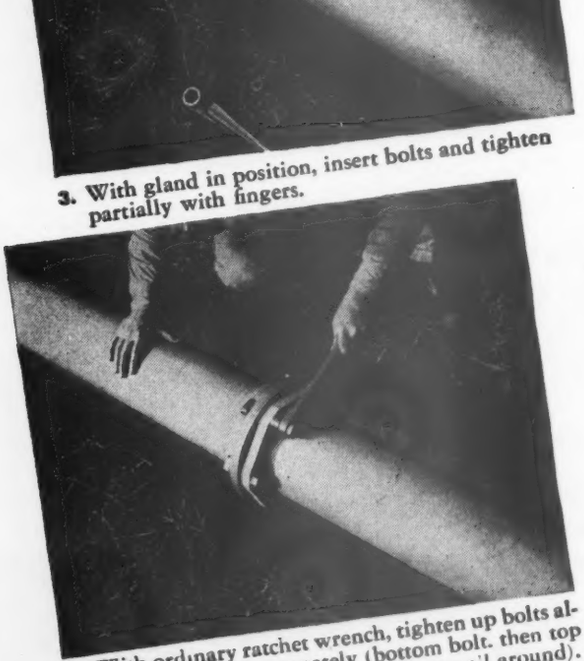
1. Brush socket, spigot and gasket with soapy water.

2. Slip gasket into position, making sure it is evenly seated in the socket.



3. With gland in position, insert bolts and tighten partially with fingers.



4. With ordinary ratchet wrench, tighten up bolts alternately (bottom bolt, then top bolt, and so on all around).

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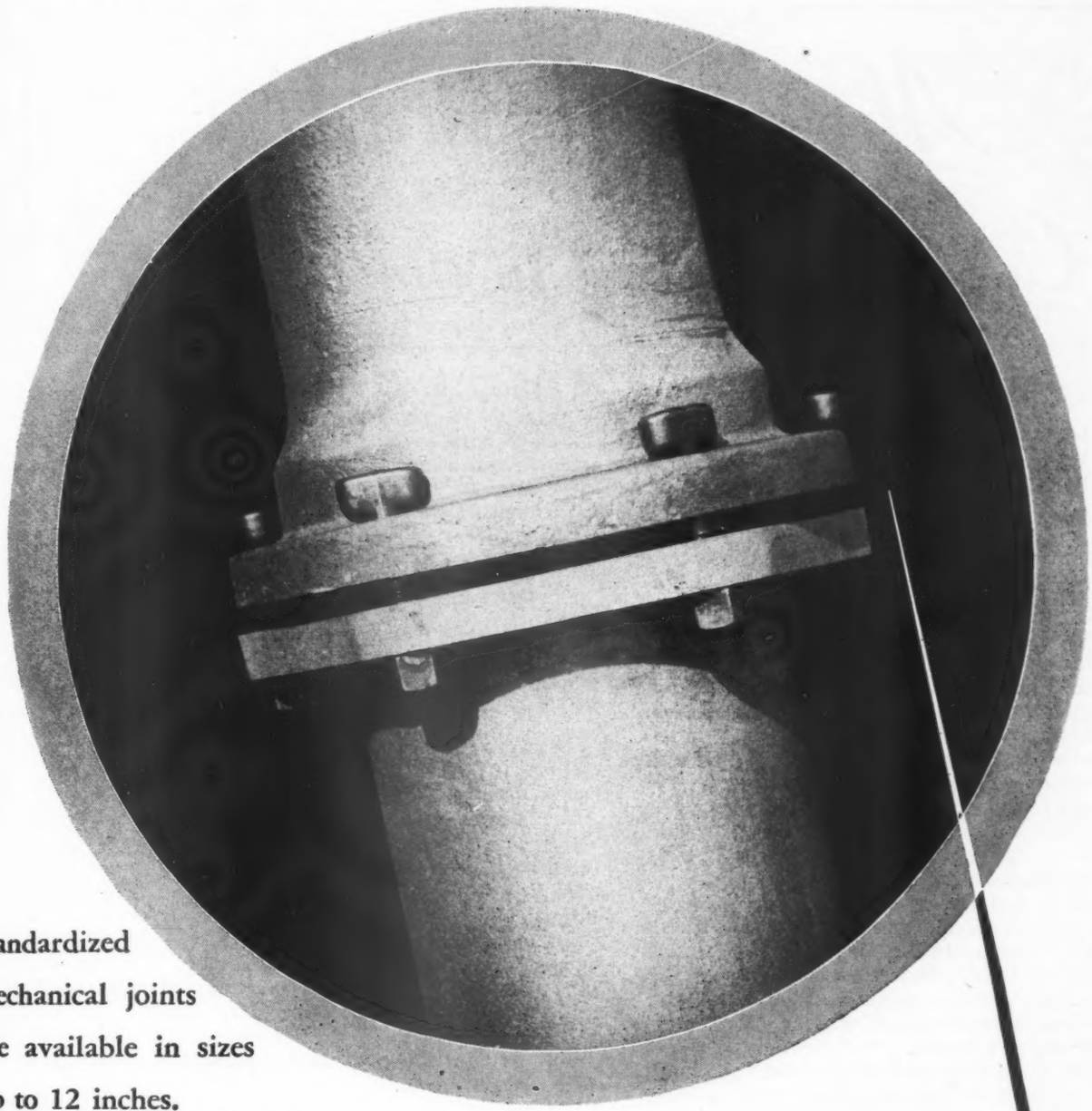
Standardization adds the final touch of convenience and simplicity to mechanical joint cast iron pipe. Gas engineers who have sworn by it for years, now like it better than ever.



Standardized mechanical joints are available in sizes up to 12 inches.

NOTE: Mechanical joint cast iron pipe is available in sizes up to 48 inches. Standardization of these larger sizes is being developed. Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3, Ill.

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PIPE

Abstracted Articles of Current Interest to the Industry

Fuels

What Postwar Outlook For Natural Gas?
Financial World, Oct. 17, 1945

Annual sales increased 35% to total of 2,187 billion c.f. since 1941 to 1944. Pending completion of reconversion by the heavier gas consuming industries, sales of natural gas may show a substantial cut-back, largely temporary, and moderated to some extent by more generous use in commercial and household channels.

Gas Carburizing
The Iron Age, October 18, 1945

This is a three part article on carburizing in gaseous media in addition to reviewing the existing literature on the subject to contains valuable information on application of this theory to practice. First part begins with a general summary of carburizing and decarburizing and then discusses of choice of steels for best results and effect of grain size. In subsequent articles, the various gaseous media, mechanism of carburization and heat treatment of carburized parts are to be considered.

The process of carburizing is applied to finished or semi-finished articles of ferrous metals with the object of increasing the carbon content on the surface so that when subjected to suitable heat treatment, the surface portion will be substantially harder than the underneath surface. Thus a low-carbon steel article which in its original condition will harden but little on quenching, can be carburized and then quenched, producing a hard, strong, wear resisting surface and a soft tough interior.

An important characteristic of gas carburizing is the ease with which the case composition can be controlled. By suitable adjustment of time, temperature and gas composition, the surface carbon and the carbon gradient can be varied to meet almost any requirement.

The Removal of Hydrogen Sulphide from Fuel Gases. G. U. Hopton, B.A., B.Ss., A.M.I.Ch.E., R. H. Griffith, B.A., D. Phil.
Gas Times, Dec. 8, 1945

One of the longest established methods of purification of fuel gases is that in which hydrogen sulphide is removed by means of iron oxide. The treatment is highly efficient and concentrations of hydrogen sulphide below 1 part in 10 mill, can be reached. There still remain, however, certain features of the process which are difficult to explain and some disadvantages in ground space requirements and handling charges. For these reasons, the reactions involved have been newly investigated with two objectives; firstly, to determine which form of iron oxide is most suitable, and secondly, to attempt to improve the speed of the reaction with a consequent reduction in the size of plant. Two series of tests have been carried out with iron oxide in granular form, one in two steel towers and the other in a box of reinforced concrete. The towers were both 2 ft. in diameter and had a packed space 8 ft. 6 in. high, giving a total oxide volume of 53 c. ft. Means were provided for feeding pellets to the top of the towers and for withdrawing from a discharge hopper at the bottom. Coal gas was passed through the towers in series at 4,000 c. ft. per hr. and removal of H_2S was for a time complete.

Heat

Flame-Gouging of Steel Castings.
Materials & Methods Nov. 1945 pp. 1428-31 A. E. Blake, Jr.

The Chipping Method of removing defects from steel castings is usually classified into the following fundamental groups:

1. Green chipping necessary as a result of imperfect molds, core joints, slag-removal, and small quantities of fused sand around brackets.
2. Removal of cracks, sand inclusions, blow holes shrinkage, or pinhole porosity from the parent metal structure of pressure-cleaned castings and the preparation of these areas for proper welding. The use of a variety of chisels, actuated by pneumatic hammers, are required for this process.
3. Removal of metal-penetrated and fused sand. Blunt chisels, actuated by pneumatic hammers, are employed to remove this sand.
4. Chipping and grinding of welds following welding and strain annealing. This operation is usually performed with chisels and grinders.

City gas, of approximately 550 B.t.u. per cubic foot heating value, is purchased at the Everett Works for preheating purposes. Pressure is boosted by means of a composer and is controlled by standard line gas regulators. A gas pressure of from 25 to 35 p.s.i. is employed, and the oxygen pressures run from 40 to 125 p.s.i. depending on the tip used.

The highest pressures are used when "washing down" riser pads or swells on either machined or non-machined surfaces.

Considerable reduction in "extra' finish has been accomplished in this way. Rather large riser pads and swells, located in areas difficult to flame-cut without damage to the casting and uneconomical to chip down, have been quickly reducted to casting contour by flame-gouging. The average oxygen consumption for flame-gouging is from one third to one quarter that of the flame cutters per man, per day.

The key to success is applying flame-gouging to steel castings is in the selection of an operator with proper qualifications, both mental and physical. He should have a good knowledge of welding as well as the skill

required to use oxy-gas equipment. The qualities of manual dexterity, mental analysis, patience, etc., required of a good welder are also required of a good flame-gouger. All of these qualities result in the production of the most satisfactory weld preparations, requiring a minimum of weld material and time. In addition to this a rather young man, possessing high physical stamina is apparently the best prospect, since physical application stands high and the job conditions are not of the best.

Considerable practice on scrap is necessary before an operator can undertake some of the more simple preparations under careful supervision. If an inexperienced operator, though he is a good welder, burner, or both, is allowed to start on actual castings, it leads to very disappointing results. Further experience is necessary to develop dexterity and judgment. Once trained, however, a skillful operator will produce gratifying results.

Large and Small Gas Immersion Tubes
Industrial Heating Dec. 1945 pp. 2090-2100

This article summarizes the results of two years investigation of gas immersion tube performance by the Committee on Industrial Gas Research of the American Gas Association.

During the investigation, certain empirical relationships involving heat transfer characteristics of gas immersion tubes and their physical dimensions were developed, which are presented in the article, and their applicability to the design of gas-fired immersion tubes for industrial use is discussed. In addition, results obtained on overall performance characteristics of commercial deep-fat fryers embodying gas immersion tubes is presented, together with data on experimental fryers showing promise of increased heating speed and recuperation. These data on the fryers are generally related to all immersion tube heating.

Large gas immersion tubes were discussed in the first installment of this article, with reference to the numerous factors that can affect their efficient application to industrial heating operations. The present installment will begin the discussion of small gas immersion tubes.

One of the most popular but comparatively recent applications of immersion tube heating has been in hotel and restaurant deep fat fryers. Immersion tube heating is particularly well qualified for this purpose since it is capable of providing a cool zone at the bottom of the cooking compartment. This characteristic prevents prevents rapid deterioration of the cooking oil, therefore providing more satisfactory and economical performance.

Some Limitations of Dielectric Heating, by C. J. Madsen.
Electric World, Sept. 15, 1945 pp. 94-95

Dielectric heating is applicable only to materials normally considered poor conductors of electricity or insulators. In general dielectric heating becomes attractive when the thickness of the material is sufficient to make it difficult to heat through in the conventional manner. It only becomes economical because of,

1. Producing a result not possible by other means of heating.
2. Increasing speed of a process and saving labor and overall equipment cost.
3. Producing or confining heating in the part or point where needed, thus reducing overall power consumption.
4. It is clean and compact.
5. Reduces rejects or improves production quality of a product.
6. Flexible in its application to variety of operations processes or products.

Heat Treating

The Heat Treatment of Steel Castings.
Materials & Methods, October, 1945 p. 1127

1. Preparation for heating: Castings of similar dimensions should be in the same heat because they will have similar heating and cooling rates; this is especially important if the castings are loaded on racks or fixtures for batch quenching. Only by properly arranging the parts in the furnace or racks can even heating and maximum (uniform) quenching effects be obtained. If the castings have potentially delicate areas (sudden) changes in section, or very thin sections these must be adequately protected by "blocking-off" with fire clay or with a mixture of fire-clay and asbestos to prevent warping or cracking.

2. Heating: The heating rate should be slow and accurately controlled so that complete austenization or solution of the carbides takes place in all sections of the castings in the heat. Both the temperature and the time at temperature must be carefully controlled for reproducible hardening results.

3. Quenching: The temperature of the castings at the instant of quenching must be the same each time if consistent hardening results are to be obtained. This means that the furnace load or the individual castings must be quenched from the same temperatures and they must be transferred from the furnace to the quench tank in the same time interval. Conditions of the quench (i.e., rate of circulation of quenching medium and its temperature) exert considerable influence on the reproducibility of the results. Another item requiring accurate supervision is the time of immersion of a casting or a rack of castings in the quenching medium (in general, the lighter sections of a casting are not allowed to cool below 250°F. while in the quench).

Intermittent, or timed, quenching is the technique usually employed in the quenching of steel castings. In this practice the load or casting is immersed in the water for a predetermined length of time after which it is withdrawn to allow the heavier (and warmer) sections to transmit heat to the thinner (and cooler) sections. In commercial practice the castings are submerged in water until the thin sections have cooled to a 250 to 300 F. (the heavier sections are then at a temperature of about 500 F.), and after removal from the water, the heat flows from the warmer to the cooler sections, thus preventing dangerous internal stress that might result in warping or cracking. For small castings the time of immersion is but a few seconds; the time for 6500 lb. castings is 3¾ min.

4. Tempering: This operation serves a double purpose: it relieves stresses caused by non-uniform cooling, and it proves the ductility or machinability of the castings.

High Speed Metal. Heating With Ceramic Radiant Burners.
Materials & Methods, October 1945, pp. 1074-1078.

Ceramic-supported combustion is a means of attaining heat concentrations, flame beyond the limits of conventional burners and furnaces. The five outstanding properties are:

(a) Ceramics stand up under heat to 3100°F. with 50,000,000 b.t.u. per hr. per c.f. of combustion space.
(b) Ceramics act as high temperature radiators when employed in such a manner that they are scrubbed by burning gas-air mixtures.
(c) Ceramics permit close tolerance burner designs of amazing intricacy; ±1% is standard tolerance.

(d) Ceramics do not scale.
(e) Ceramics do not chill combustion reaction before it runts its full course.

The primary industrial results of ceramic-supported combustion are increasing speeds of heat transfer and decreasing sizes of equipment necessary for its attainment. Consider the possible implications of the following techniques upon whole segments of industry.

By assembling radiant gas burners into a sleeve not much larger in internal diameter than the tube, bar or rod stock to be processed, a short "hell-hole" (Fig. 1) may be formed through which considerable tonnage may pass length after length, end after end—such that every section of every length traverses the same path through the same cell for the same heat treatment. Heat transfer is so accelerated that no increment of metal is under heat for more than a few seconds or minutes—quite a contrast to the hours of soaking in conventional equipment. Obviously deterimental effects of time-at-heat (scale, decarb, etc.) are materially lessened. Lineal speeds of heating up to 40 ft. per min. for solid materials up to 1½ in. in diameter have been attained.

By similarly enclosing moving metal strip between facing panels of radiant burners both ferrous and nonferrous materials in strip form may be heat treated on the fly. For brightening tin-plate gas-fired panels of 75 burners each (measuring 3 ft. x 6 ft. in panel area) have been used for strip speeds up to 600 ft. per min.

Parades of parts in single file through compact tunnels further condense the conventional furnace into a heat-treating machine—the burner spacings and adjustments along the length of the tunnel providing accurate control over complex time-temperature cycles required upon work pieces. Such equipment frequently performs two jobs at once or in sequence (e.g. an assembly-by-braxing and an anneal) — or heats parts locally (as in the case of process-anneals between reductions where only the zone to be shaped requires heating).

By studding small bells with radiant gas burners, stell billets measuring as much as 6 in. across by 15 in. long have been heated to 2200°F. in intervals as brief as 18 min.—uniformly within 50°F. over the entire billet surface and into the billet core. The possibilities in forging are obvious, and, of course, one thinks of the annealing or nitriding bell.

In all such instances (even as in the single-file nonstop class), an "envelope" of ceramic cup burners is closed down about the work so tightly that both the radiant and the convected heat transfer rates are enormously accelerated. Radiant heat transfer is sped because of the large area (in relation to intervening furnace wall area) of the burner cups, plus their extremely high radiating temperatures. Convected heat transfer is multiplied because of minimal volume between the work and its burner envelope and the consequently increased rate of sweep of hot products of combustion past the work surface. Further, in every case, the space pattern of the burners may be manipulated to compensate for unequal heat losses over the piece, thereby attaining uniform rates of temperature rise in all parts—or conversely, heating local regions for selective results without affecting the remainder of the part.

Flame hardening and flame annealing with city gas and air—as well as silver alloy brazing in open production-line equipment—represent another class of machine-tool-for-heat-treatment resulting from the new art of ceramic-supported combustion.

The compacted, or encased, type of combustion here plays a dominant role, although ceramic-ribbon burners and radiant-cup burners also find use.

In many cases the burner inflection is the whole unit. Thus one installation has 72 burners on a common manifold specially developed to process signal wire coatings. Eavh strand passes through the vertical axis of its own burner. Each burner is, in effect, a 6 in. "wrapper" of incandescent ceramic—gas-fired from a ceramic ribbon directly opposite the slot which permits the burner to move back from the wire in the event that the wire stalls.

In all such cases it is the five properties of specially shaped and constituted ceramic parts listed earlier which make possible the manipulation of gas-air combustion in such ingenious, effective and unusual ways..

Ceramic-supported combustion, indeed, is reshaping many branches of industrial process heating.

Instruments

Measuring Devices for Atmosphere and Combustion
Industrial Heating, Dec. 1945 pp. 2082-84-86-88

One of the sessions on instruments for quality control which formed part of the program of the Group Meetings sponsored by the American Society for Metals at the National Metal Congress, held in Cleveland, Ohio, October 16 to 20, 1944, was devoted to a discussion of measuring devices for atmosphere and combustion. Individual subjects included: process and combustion-gas analyzers; a dew point potentiometer and recorder; use of flow meters in steel plant operations; furnace pressure meters and controls; and gas mixing and fuel-air ratio controls. This article summaries remarks of the speakers.

The gases produced by complete combustion of commercial fuels are carbon dioxide, water vapor, oxygen and nitrogen, as determined by flue analyses. Incomplete combustion produces the following gases in varying amounts, depending upon the gas-air ratio: carbon dioxide, water vapor, carbon monoxide, hydrogen and nitrogen.

Certain heat treating atmospheres require the operation of furnaces with a reducting atmosphere, obtained by firing the furnaces with a deficiency of air. Fuel can be saved and work spoilage prevented by using instruments to continuously determine the percentage of unburned fuel constitutents in the flue gases so as to maintain the fuel supply at the minimum level consistent with satisfactory atmosphere. This can be accomplished by the instruments referred to above as available for determining combustibles in the flue gases.

The combination of the instruments of the types discussed here with automatic proportioning burner equipment will produce good results in the control of combustion conditions.

The dew point potentiometer and recorder is a new development for continuously determining and recording the dew point of furnace atmospheres.

Heretofore, there has been relatively little attention paid to the humidity of furnace atmospheres. The importance of water vapor in such atmospheres is now appreciated, and steps are being taken for its control. Control of humidity necessarily required development of a means for determining this quantity.

The mirror-type dew-point determining apparatus has been available for some time, and operates upon the principle of determining the temperature at which a highly-polished mirror fogs due to the precipitation of moisture from an atmosphere in contact with it. Temperatures have been measured with an ordinary ther-

mometer, and the fogging of the mirror determined visually.

More accurate procedures that would also give a permanent record were realized to be desirable, and have been developed.

An electronic indicater is one of these developments, which depends upon the principle of ionization of water vapor to negative ions by electron bombardment. The degree of ionization of the atmosphere, as determined by suitable instrumentation, is taken as a measure of the amount of water vapor present. The instrument is valuable in applications where very low dew points are desired.

A second type of dew-point determining instrument is the potentiometer-indicating type, which can be contained in a portable case. It is capable of determining dew points between 110 and 100 deg. F, and can be furnished with a double scale. It can be used to determine the dew point of gases at high pressures, and is entirely self-contained. A stream of the gas to be studied passes through a tube to a compartment where it comes into contact with a mirror to which a thermocouple is attached. The mirror is cooled by external means until it fogs, at which point the temperature of the thermocouple, as determined by the potentiometer, gives the dew point.

A third type of instrument is similar to the second one, just described. However, it is not a readily portable instrument. It is supplied with a small refrigerating unit, similar to that used with domestic refrigerators, which circulates the refrigerant to cool the mirror. A light source plays on the mirror, the light being reflected to an electric eye. When the mirror fogs, the drop in intensity of reflected light is immediately deflected by the photoelectric cell, giving the dew point accurately. The temperature of the mirror is simultaneously recorded continuously with the readings on reflected light from the photoelectric cell, thus giving a permanent record.

The first and second instruments described above have been in use for some time. The third is still in the developmental stage. The accuracy of the second type is about 2 deg. F, since a thermocouple is involved and visual determination of fog is necessary. The first, or electronic, instrument was developed to measure gases having extremely low dewpoints that are used in powder metallurgy.

Flow meters used in steel plant applications often are designed as controllers to maintain the proper relationships in the fluids they measure. Other flow meters merely indicate or record flow.

The efficient distribution of air, water and fuels is important to economical plant operation, and requires metering in order to be able to balance supply and demand.

Meters provide a continuous record of the perfection of operation of certain classes of equipment.

The plant under discussion is equipped with 325 flow meters of various types for different purposes.

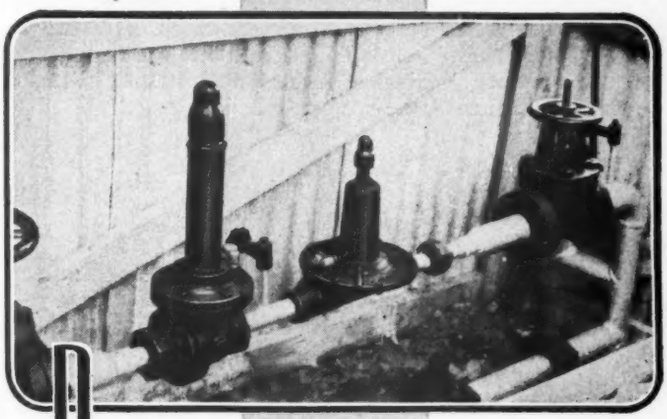
This plant utilizes all of its by-product fuels to the best advantage through control made possible by accurate metering, and reduces the amount of purchased fuel that must be obtained from outside sources.

The last scheduled subject to be discussed at this session covered gas mixing and fuel air ratio controls.

Mixed gas is important in steel plant operation because of the economies effected and because of the benefits that accrue to the heating processes.

To regulate gas mixing, a heatflow factor has been developed which correlates the Btu. content per cu. ft.

PRESSURE REDUCTIONS OF
FROM 1000 TO 15 LBS.
(IN TWO REDUCTIONS)



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and the gravity of the gases involved. By mixing two more gases to a mixture having a definite heat-flow factor, a good fuel results that stabilizes furnace operation by providing a constant heat input and constant gas pressure.

Gas mixtures, to be equivalent, must be mixed to the same heat-flow factor. Numerous methods for mixing are available which are both efficient and safe. Air or blast furnace gas can be used as a diluting medium when required. Blast furnace gas eliminates some of the dangers involved in the mixing and handling of gas-air mixtures.

By following this practice, a stabilized gas is provided that can be compared to a base gas, which gives better control of furnace atmospheres, and keeps the heaters unaware of major changes in the nature of the fuel gas being supplied to their furnaces.

Metals

Trends in Metallurgy
Wire, October 1945 pp. 758-761

This paper emphasizes the increasing need for a more thorough understanding of fundamental scientific principles to general problems without getting theoretical. Physical metallurgy is the common ground on which factory and laboratory should work out the problems of production.

The Engineers Digest
Stressed Metals at Elevated Temperatures

Determination of the high temperature strength of steels by short time testing at room temperature is too simple to give a true account of the physical phenomena involved. Determination of the permissible working stress on the basis of long time tests of several thousand hours duration is essential.

It was found that notched test pieces made of certain steels exhibit a greatly inferior strength under low stress or long time load as compared to a notch free piece. This is a clear indication of brittleness. It can therefore be concluded that the behavior of steel under stress at elevated temperature is characterized by two strength values, resistance to deformation and resistance to fracture. The former can be ascertained by a short-time test but the latter must be determined by a long time test.

Since certain alloys of tin and cadmium exhibit inter-crystalline fracture under long time load at room temperature, alloys of this type were employed for fundamental investigation. This permitted simplification of the testing equipment.

Tests conducted on an alloy composed of 94% Sn and 6% Cd showed that in both the cold worked and the heat treated state, the strain characteristic of the notched piece intersects that of the notch-free piece as do low alloyed steels stressed at temperatures of about 500 C.

The time-to-rupture characteristics obtained for a number of different notches show that irrespective of the shape of the notch, the time-to-rupture curve of the notch-free specimen approaches that of the notched as the time-to-rupture is increased. With a greater depth of notch, the points of intersection advance towards earlier time-to-rupture points. A vee-notch causes a more rapid downward slope of the time-to-rupture characteristic than one of blunter shape. It is concluded that this is due to triaxial stresses in the interior of the material.

Increase in the depth of the notch leads to reduction of area at the time of fracture, if the time-to-rupture is increased by reducing the loading of the bar. This is because the occurrence of intercrystalline failure is accelerated by an increase in the triaxial stress.

Tests with alloy steels show the physical processes involved are identical with those of the tin-cadmium alloys, excepting the presence of structural changes in the steel. Therefore, it is deduced that the mechanism of creep is qualitatively the same in every metal and that intercrystalline fractures may happen in any metal. The main cause of such fracture is the precipitation of carbides, nitrides, or oxides, which cause a weakening of the grain boundaries and a blocking of the slip planes in the crystals.

It appears feasible to develop an efficient short time test. Long-time rupture tests would be carried out on notched bars, with contraction and elongation measured in the usual manner. These data would be used to establish both the deformation-less elongation and the elongation-with-deformation, the ratio of the two being a measure of the cohesive strength of the material.

Miscellaneous

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Machinery, v. 52, *pp.* 173-183, *Oct.,* 1945
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Metal Progress, v. 48, *pp.* 905-916, *Oct.,* 1945.
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G.E.C. Jl., v. 13, *pp.* 109-142, *Feb.,* 1945.
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CRUSE-KEMPER COMPANY
AMBLER, PENNA.
GAS HOLDERS
Low Pressure High Pressure Inspection
Purifiers Tanks Flues
Over 40 Years of Sound
Steel Plate Construction

RECENT COURT DECISIONS
Affecting Gas Utilities

Review of Outstanding 1945 Gas Higher Court Decisions

By
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

DURING the year 1945 the higher courts rendered many outstanding decisions involving both municipalities and gas corporations. Therefore, we shall briefly review these important and outstanding decisions. Since many of the hereinafter decisions are very briefly explained, readers who desire details of specific law suits may refer to the citation and readily obtain and read the complete decision in any good library.

Statute Prevails

According to a late higher court decision a state statute has priority over a municipal charter provision which conflicts with or contradicts the state law.

For example, in State ex rel. Weaver et al. v. City of Knoxville et al., 188 S. W. (2d) 329, reported August, 1945 ,it was shown that the City Council of Knoxville passed a *resolution* authorizing the purchase of the properties of the Knoxville Gas Company and an issue of $450,000 of bonds to pay for the same.

The legal question presented the court was whether a statute, which authorized cities to issue bonds to acquire public works, was valid or whether a charter provision prior to the state law prevails which requires enaction of an ordinance rather than a resolution for the bond issue.

This court held the state statute prior and effective, saying:

"It has long been settled . . . that a municipal charter is subject to repeal or amendment at the will of the legislature."

Truck Injury

Modern higher courts consistently hold that a pedestrian injured by a motor truck cannot recover damages unless the testimony shows that the injury resulted from negligence of the truck driver.

For example, in Mackall v. Washington Gas Light Company, 147 Fed. (2d) 149, reported March, 1945, it was shown that a pedestrian was seriously injured by a motor truck owned by a gas company. In holding the company not liable for the injury the higher court said:

"It appears perfectly clear that the injured girl never got to a point within the driver's normal range of view."

Broad Damages

Generally speaking, a damage judgment against a negligent truck driver employed by a gas company may include *all* damages sustained by the injured party.

For illustration, in Kentucky Transport Company v. Campbell, 186 S. W. (2d) 409, reported May, 1945, it was shown that a driver named Campbell was driving his truck to which was attached a 23-foot trailer. A truck and 20-foot trailer owned by a corporation was being operated on the left side of the highway and collided with Campbell's truck. Campbell sued for heavy damages.

The higher court held that Campbell was entitled to recover an amount of damages from the corporation including his personal injuries, loss of use of the truck and trailer, cost of repairs, and permanent injury to the truck and trailer.

Driver Is Negligent

Failure of a gas company's truck driver to warn drivers of other automobiles of an apparent danger is "legal negligence" for which the company was liable.

For example, in Herring v. Holicer Gas Company, Inc., 22 So. (2d) 868, reported July, 1945, it was shown that a man named Herring sued for physical injuries sustained by him and for the value of his automobile destroyed in a collision with a trailer owned by a gas company.

During the trial the testimony showed that the driver of the gas company's truck decided to make the turn by backing the trailer into the intersecting road and then drive the truck gradually outwardly. There was no traffic within view of the driver. He had backed only a few feet when he observed the lights of the car owned by Herring coming toward him over a rise in the road. Herring collided with the truck.

The higher court held Herring entitled to recover full damages from the gas company because the truck driver was negligent in attempting to turn in this manner without first placing on the highway flares or other means to warn drivers of other automobiles of the danger. This court said:

"That the driver of the truck was grossly negligent in attempting to turn it and the trailer at the time and place mentioned, it seems to us, is not open to debate."

Robinson-Patman Act

All contracts, combinations, and agreements which tend to create a monopoly are unlawful. However, definite proof must be given that a gas company actually violates this legal rule otherwise it does not violate any anti-trust law.

For example, in Willard Company v. American, 22 So. (2d) 461, reported June, 1945, it was alleged that a company had violated the Clayton Act and the Robinson-Patman Act by selling products in one state for less than in another state.

It is interesting to observe that the

higher court held that the company had not violated any anti-trust law and said:

"The validity or invalidity of an agreement that in operation tends to restrain trade or to monopoly is in general determined by the element of whether it is or is not injurious to the public."

In other words, the fact that a product or merchandise is sold in one state for less than the same is sold in another state is not a violation of the anti-trust laws, unless the testimony proves that the public is injured.

Also, it is important to know that this higher court stated that the phraseology of the Sherman Anti-Trust Law and the subsequent two acts, namely the Clayton and Robinson-Patman Acts, are so similar that any difference between the one and the other two becomes quite obscure.

Within Scope of Employment

An employe may recover compensation under the Workmen's Compensation Act for injuries which result from an accident arising out of and in the course of his employment. According to a late higher court decision an employe who is directed by his employer to go to his work at an *unusual* time is within the scope of his employment from the moment he leaves his home.

For illustration, in Eargle v. South Carolina Gas Company, 32 S. E. (2d) 240, reported February, 1945, it was shown that one evening an employe was given special instructions by his superintendent to report for work the next day at the plant, on Christmas morning, on an emergency. The employe was killed while going from his home to the gas company's plant.

Although the lower court refused to allow compensation to dependents of the deceased the higher court reversed this verdict. In holding the dependents entitled to recover compensation, the higher court said that an important point of testimony in favor of the dependents was that the evening before the accident the employe had been specially instructed to report for work on Christmas morning.

Must Prove Facts

Modern higher courts have adopted a rule that an employe who sues to recover state compensation for an injury is bound to *prove* that he was injured while working within the scope of his employment. Otherwise the court will *not* award compensation.

For illustration, in Lee v. Memphis Natural Gas Company, 197 So. 639, an employe of a gas company filed a suit to recover compensation under the State Workmen's Compensation Act. The employe alleged that he slipped and fell seriously injuring his back and spine while doing his regular work.

However, since the employe failed to prove by fellow workmen, or others, that he had received the injury while doing his regular work, the higher court refused to allow any compensation.

Company Not Notified

A gas company is not liable in damages for injuries caused by an explosion of gas in pipes outside the scope of the gas company's control and ownership.

For example, in Doxstater v. Northwest Cities Gas Company, 154 Pac. (2d) 498, reported January, 1945, it was shown that great damage resulted from explosion of gas when a property owner attempted to light a gas water heater in his basement.

The higher court reversed the lower court's verdict, and held the company not liable, because the testimony proved that the gas company did not own nor control the heater or connecting pipes.

Capping Is Negligence

Modern higher courts consistently hold that it is legal negligence for a gas company to "cap" a discontinued gas pipe line.

For example, in Goodman & Theise, Inc., v. Scranton Company, 43 Atl. (2d) 111, reported August, 1945, it was shown that a gas company removed its meters from an abandoned house and capped the service pipe inside the cellar wall. Thus gas was in the pipe under pressure from the street to the main.

Several years later a violent explosion of gas occurred when the service pipe leaked.

In holding the gas company liable the higher court said that although the service pipe was owned by the property owner, yet the gas in it was owned and controlled by the gas company.

Stabilization Act

According to a late higher court decision a Public Service Commission may reasonably increase gas rates notwithstanding provisions of the Stabilization Act.

For example, in Western Kentucky Gas Company v. Public Service Commission, 188 S. W. (2d) 458, reported August, 1945, it was shown that a gas company filed an application for increase in rates. The local and chief offices of the Office of Price Administration were notified but did not take an active part in the matter. The Public Service Commission rejected the application and refused to allow an increase. The gas company's counsel appealed to the higher court on the grounds that present rates are confiscatory because the fair value of its property is $325,396, and for the year 1941 its operating revenue was $4,262.91, resulting in a return of only 1.3 per cent on its rate base.

The higher court reversed the Public Service Commission's decision and held that the latter may "reasonably" increase the rate of the gas company unless the increase would violate the purpose of the Stabilization Act which prohibits increase in rates of a public utility without giving notice to named officials.

L. E. Reynolds Elected to Controllers Institute

Lester E. Reynolds, auditor and assistant treasurer of the Connecticut Light and Power Company, Hartford, has been elected to membership in the Controllers Institute of America. The Institute is a technical and professional organization of controllers devoted to improvement of controllership procedure.

The Reliable Shut-Off for Street Mains

THE GOODMAN STOPPER

Now has the "Z" handle for easy manipulation. When locked in place it holds. Stopper cannot slip. Gas cannot pass. Adjusted in 30 seconds.

Ask for circulars on this and other distribution equipment.

Nearly a half century of service to the Gas Industry.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

"What woman *wills*... will be"

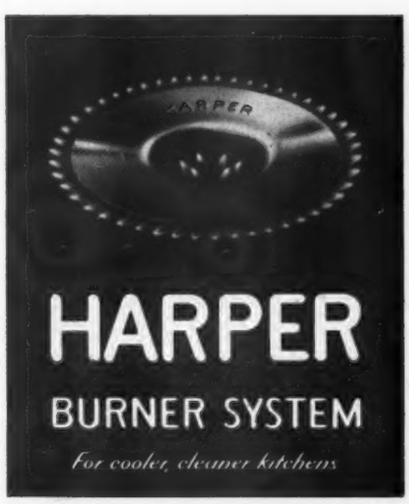
Today she wants Harper top burners

IT WAS DIFFICULT to convince her lord and master, but woman finally won the right to vote. And because it represents today's *ultimate* in top burner cooking, women now are insisting that the Harper Burner System be standard equipment on their new gas ranges. They want it because:

Each burner is actually 2 burners in 1 . . . a burner within a burner . . . both operated and controlled by a single handle. The small, inner *cooking* burner can be used entirely independently of the outer *starting* burner. No other top burner possesses this vital advantage, which insures easy, accurate control —just the right heat for every type of top burner cooking.

The AGA is conducting a campaign of appliance improvement and promotion to maintain and improve the position of gas as the ideal cooking fuel . . . for cooler, cleaner kitchens. So far as top burners are concerned, the Harper Burner System meets these objectives perfectly.

Copr. 1946, Harper-Wyman Co.



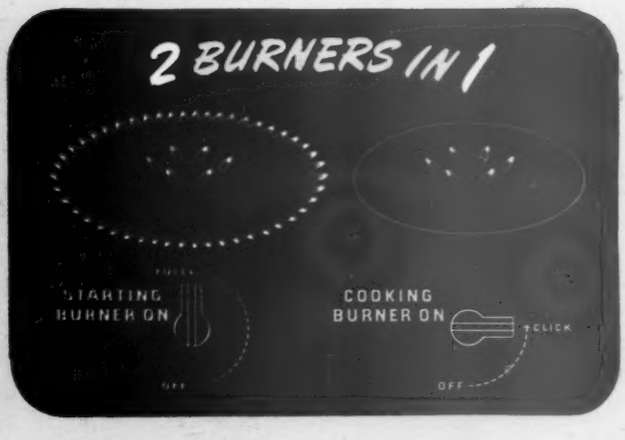
On next page
WHAT USERS SAY

"No Double Boiler Needed"

with HARPER BURNER SYSTEM this housewife says

COOKING OPERATIONS are quicker and more convenient with the Harper Burner System. For example, Mrs. G. R. Reed, 103 Champlain St., Burlington, Vt., says:

"You don't need a double boiler for cooking cereals if your range has the Harper Burner System. It is even easy to melt chocolate in a pan without burning when you use the little cooking burner."



The Harper Burner System operates on the unique principle of "2 burners in 1"... a **STARTING BURNER** *plus a small, economical* **COOKING BURNER,** *both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner.*

Flexible, accurate control of low heats

ORDINARY BURNERS require the use of a double boiler for cooking cream sauces, semi-liquid cereals, or for melting sugar or chocolate. But the Harper Burner System does not. Only a small amount of heat is necessary for this type of cooking, and that is just what the tiny, separate Cooking Burner of the Harper Burner System provides. At ½ height... or even less for the exact heat desired... its flame is ideal for many cooking uses requiring exact low heats.

Besides making it possible to process these foods more conveniently, the Harper Burner System saves fuel and time . . . all important advantages to the housewife.

NOTE: A *new* and *improved* Harper Burner System is now available for range manufacturers who are producing de luxe ranges. Harper-Wyman Company, 8562 Vincennes Avenue, Chicago 20, Ill.

HARPER BURNER SYSTEM "HOLDS THE LINES FOR GAS"

HARPER BURNER SYSTEM —*One of the standards of top burner performance under* GP

Musical Recordings Popularize Gas and Promote Good Will

California Companies Celebrate Fifth Year of Evening Concerts

By
Fred A. Herr

SOUTHERN California Gas Co. and Southern Counties Gas Co. of Los Angeles have conclusively demonstrated the advertising and publicity value to gas utilities of company-sponsored radio broadcasts that accent the cultural note in radio entertainment.

Six nights a week, 52 weeks a year, for more than five years, these California utilities have jointly sponsored a two-hour program of classical music which comes on the air at 8 p.m., with the simple announcement, "Your Gas Company Presents the Evening Concert."

October 1, 1945, marked the fifth anniversary of the gas companies' radio concert hour, obviously a long enough period of time to demonstrate the value of such good-will advertising for utility concerns.

An effort is made to invest these programs with an air of dignity and refinement. This is accomplished by holding "commercials" to a minimum, a policy, which the two Los Angeles gas companies have found, tends to maintain listener appeal.

The musical selections are comprised entirely of recordings. The selections are made by the radio station's announcer from KFAC's large library of recordings. The gas companies merely specify that the selections be classical. The programs have at times included light operas by Gilbert and Sullivan but the general policy is to exclude grand opera, one reason being that most grand operas are too long to be possible of presentation in two hours.

Commercialism Minimized

The announcements are of two types. The non-commercial introductory announcement is purposely phrased to include no reference to *business* and is confined to the simple statement by the announcer, "Your Gas Company Presents The Evening Concert." These non-commercial introductions are varied seasonally to key them to such holidays as Christmas, Thanksgiving, New Years, Easter, Fourth of July, etc. Typical of the seasonal introductions is the one used last Thanksgiving Day. It read:

> **"Today your gas company's Evening Concert brings you a program in the mood of Thanksgiving. This year Thanksgiving has a special depth of meaning for most of us. The world has so recently emerged from war. There are times when we cannot be quite as articulate about our thoughts and feelings as we would like to be. And it is on such occasions that music offers us its greatest solace. We hope that our listeners will find this Evening Concert a welcome Thanksgiving Day Interlude. The selections you are about to hear are in the spirit of Thanksgiving."**

In keeping with the seasonal theme, the musical program for Thanksgiving Day included *Prayer of Thanksgiving,* an Old Dutch Air, and *Missa Solemnis* by Beethoven.

The strictly commercial announcements are injected three times in the course of an evening. They are kept short and snappy and are phrased to bring to the radio audience's attention, briefly but pungently, the advantages of gas as a fuel and gas appliances as home conveniences.

A typical commercial is the following:

> **"Perhaps nothing is more annoying to a man than to step jauntily into the shower, whistling a merry tune, only to find there's no hot water. And a sure sign of trouble from the lady of the house is to have the same experience when she's faced with a stack of dishes. But those annoyances will be a thing of the past in your new Freedom Gas Home tomorrow. Your new automatic gas water heater will have an abundance of hot water, always ready, for every use. And you'll never need give it a thought or consider your pocketbook. Your family can still enjoy their showers—even on wash day. Your new automatic gas water heater means so much hot water, at such little cost—you'll wonder how you ever got along without it."**

Representative of the high plane of the musical presentations is a program lifted at random from the December, 1945, schedule.

Monday, December 3, 1945

Barber of Seville—Overture, by Paisiello, Boston "Pops" Orchestra conducted by Arthur Fiedler.

Symphony No. 1 in C Major, by Beethoven, B.B.B. Symphony Orchestra, conducted by Toscanini.

Jesus Maria Sanroma, Pianist. Concerto No. 2 in D Minor for Piano and Orchestra, by MacDowell, Boston "Pops" Orchestra, conducted by Arthur Fiedler.

Symphony No. 13 in G Major by Haydn, NBC Symphony Orchestra conducted by Toscanini.

A Midsummer Night's Dream—Incidental Music, by Mendelssohn, Cleveland Orchestra, conducted by Artur Rodsinski.

New Friday Feature Introduced

In the main, the weekly programs are planned to present piano selections on Monday night, violin selections on Tuesday and vocalists on Wednesday and Thursday nights. Light operas are given on Saturday nights. For instance, on Saturday, December 1, the Evening Concert program offered by the gas companies presented *Carmen,* by Bizet, as played and recorded by the Orchestra of l'Opera Comique of Paris, conducted by Elie Cohen. The following Saturday night there was presented *Le Nozze di Figaro* by Mozart, as played by the Glyndebourne Festival Opera Company under the direction of Conductor Fritz Busch.

Starting with the Evening Concert's sixth year in October, 1945, a Friday night feature idea was introduced under which all selections for that one night are confined to a single type of music or the compositions of one composer. Such restricted programs have included a night of chamber music, music by English composers, an all-Debussy program, etc. Other Friday night feature programs deal with music of special appeal to children, with festival music, a Pan-American musical program.

Distribute 25,000 Programs Monthly

Southern Counties Gas Co. and Southern California Gas Co. jointly finance the issuance of a printed program containing the evening radio show schedule for a month at a time. These are distributed free at the main office, and at the branch offices throughout the metropolitan area.

The program is a booklet, 9x4 inches in size, printed on book paper. Since 1941 the front cover of each monthly booklet has been adorned with a linoleum cut designed by Frantz Geritz, a Los Angeles artist, of one of the great composers. Up to the December, 1945, issue, Geritz had designed 55 such cuts featuring Bach, Brahms, Gounod, Beethoven, Schubert, Mendelssohn, Haydn, Wagner, Mozart, Handel and other famous composers.

876,000 Special Programs Mailed

The two gas companies collaborated in a special promotion program of two months duration at the time of the radio show's fifth anniversary last fall.

For October (anniversary month), a special small-size concert program was issued, 3x6 inches in size, printed on green paper. One such program was issued for October and November. This miniature edition was issued for special mailing to gas company customers. A total of 876,000 were mailed as "stuffers" with the October gas bills to customers of the two firms in Los Angeles, the Harbor District, Beverly Hills, Santa Monica, etc.

The regular sized program was issued again, beginning with December. The monthly distribution of the regular programs ranges from 23,000 to 26,000 all of which are called for in person. In December, 25,500 programs were handed out over the counters of the company's various offices.

Anniversary Widely Advertised

A comprehensive advertising program was also carried out as part of the two months special promotion campaign. The radio concert was advertised by means of 24-sheet posters on billboards in the Los Angeles metropolitan area. Twenty per cent of the streetcar advertising cards customarily used for general advertising by the two gas companies were diverted in October and November to publicize the radio program. Supplementing the above, display advertising copy in different sizes was carried in the metropolitan newspapers.

In some instances, two-thirds of the space in a 6-column display ad featured the radio program. One advertisement run in October in the four Los Angeles daily newspapers devoted space three columns wide by 15 inches deep to the radio hour, carrying a picture of a famous composer and six typical evening concert programs. The balance of the space was devoted to general gas company advertising.

In other newspaper advertisements only 6x6 inch sections of the main ad were boxed off to call attention to the radio concert. Throughout the year, however, the gas company newspaper advertisements carry tag lines calling attention to the hour and the station on which the Evening Concert goes on the air.

The special promotion was handled under the direction of J. G. Spaulding, advertising manager for the gas companies. The newspaper copy was prepared by McCann-Erickson, Inc., a Los Angeles advertising agency.

CELEBRATING THE 5TH ANNIVERSARY OF
YOUR GAS COMPANY'S "EVENING CONCERT"
2-HOUR
MUSICAL FEASTS
Dial – 8 to 10 PM EVERY NIGHT EXCEPT SUNDAY
KFAC 1330 KILOCYCLES
LISTEN THIS MONTH – to these delightful programs
TUESDAY, OCTOBER 9
ACADEMIC FESTIVAL OVERTURE, Brahms.
SYMPHONY IN D MINOR, Franck.
Nathan Milstein, Violinist –
SYMPHONY ESPAGNOLE, Lalo
SYMPHONY IN D MAJOR ("The Clock"), Haydn.
FROM BOHEMIA'S MEADOWS AND FORESTS, Smetana.
FRIDAY, OCTOBER 12
CARNIVAL OF THE ANIMALS, Saint-Saens.
TOY SYMPHONY, Haydn.
PETER AND THE WOLF ("An orchestral fairytale"), Prokofieff.
SUITE NO. 2 ("Indian"), MacDowell.
THROUGH THE LOOKING GLASS, Taylor.
MONDAY, OCTOBER 15
LEONORE OVERTURE NO. 2, Beethoven.
SYMPHONY NO. 6 IN B MINOR, ("Pathetique"), Tchaikowsky.
Alfred Cortot, Pianist –
CONCERTO NO 2 IN F MINOR, Chopin.
SYMPHONIC VARIATIONS, Franck.
SIEGFRIED IDYLL, Wagner.
WEDNESDAY, OCTOBER 24
HAMLET OVERTURE FANTASIA, Tchaikowsky.
SYMPHONY NO. 5 IN C MINOR, Beethoven.
John Charles Thomas, Recital.
THE GOOD HUMOURED LADIES – Ballet Suite, Scarlatti-Tommasini.
STANKA RAZIN, Glazounow.
MONDAY, NOVEMBER 5
CARNAVAL – Overture, Glazounow.
SYMPHONY NO. 41 IN C MAJOR (Jupiter), Mozart.
Yehudi Menuhin, Violinist –
CONCERTO IN D MAJOR, Paganini.
PICTURES AT AN EXHIBITION, Moussorgsky.
SUITE DE BALLET, Handel.
SATURDAY, NOVEMBER 17
DIE MEISTERSINGER, ACT 3, Complete.
* Typical programs of the world's finest recorded music brought to you EVERY night, except Sunday, by your Gas Company's "Evening Concert." Dial in – it's a listening habit you'll enjoy more and more! Complimentary programs printed each month are yours for the asking – call for your copy at any Gas Company Office.
MODERN...PRACTICAL...FLAME-PERFECT
It's the FLAME that makes it perfect
1 IT'S THE FLAME that broils and bakes to your standards of perfection! Flame gives you speedy heat – even heat – any shade of heat on the double-quick!
2 IT'S THE FLAME that gives silent refrigeration. Not a single moving part to wear. Its "cold" is constant, dependable, flame-perfect!
3 IT'S THE FLAME that has the speedy "recovery" to supply oceans more hot water as needed – to meet hurry-up repeat calls for everybody! And gas flame is economical!
SOUTHERN CALIFORNIA GAS COMPANY
SOUTHERN COUNTIES GAS COMPANY
GAS
The supply of Gas Appliances is still limited

The fifth anniversary of the gas companies' radio hour was publicized in a special two months promotion campaign by means of newspaper advertisements in the Los Angeles metropolitan dailies, one of which is shown here. Original size five columns wide by 16 inches high. Run in two colors using blue for border and gas flame.

Brings Heavy Fan Mail

Just how many people listen to the gas company radio program is a matter on which the advertising department of the two companies have no accurate figures available. As proof of the popularity of the concerts, however, the utilities point to the 25,000 and more programs for which people call personally each month.

That the program is popular and serves as a tremendous good-will creator is a known fact, proven, the gas companies point out, by the volume of written comment which arrives by mail each week. These mailed praises come by letter, postcard or written on scraps of paper or the backs of gas bills.

Samples of the comment are:

"Your program is very much a part of our daily schedule here and I hope it will continue in its present scope of beauty and excellence."

"The Concert Hour is the high light of the radio for me."

"Your program is indeed an oasis in a vast desert of tastelessness and blatancy."

The Southern California-Southern Counties radio program has also won favorable comment from the radio, advertising and gas industries and in 1944 was given honorable mention in the National Public Utilities Advertising Association "Better Copy" Contest as an outstanding educational program.

One of the reasons for the program's popularity, it has definitely been proven, is the use of a minimum of commercial announcements, which have deliberately been toned down to be in keeping with the dignity and austerity of the balance of the program. The Gas Company's phone number is not mentioned nor are the listeners urged to write in for anything.

with CLEVELANDS

...You get the trenching jobs done faster and at less cost... because of their...

SUPERIOR
- RUGGEDNESS
- MOBILITY
- SPEED
- POWER
- DEPENDABILITY
- MANEUVERABILITY

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE. • CLEVELAND, OHIO
CLEVELANDS Save More... Because They Do More

SUPERIOR GAS METERS

For Sound Values and Continuous Operating Economy

Meters for Domestic and Industrial Use. All Sizes 5B to 60C.
Wet Test and Demonstration Meters — Diaphragms —
Service Cleaners — Provers — Meter Repairs

Write for details and quotations

SUPERIOR METER COMPANY, INC.
167 41st Street Brooklyn, N. Y.

Underground Gas Purification

By
Arthur J. Smith
Gas Engineer
Chicago, Ill.

IN THE MANAGEMENT of a gas company I had occasion at one time to be in need of a couple of gas purifiers. Due to local conditions we decided to build them underground of concrete for the following reasons.

First: No erection of buildings to house them.

Second: No cost of heating the buildings 6 months in the year.

Third: The hazard that is involved in changing purifiers indoors, or having to watch the men so closely when working in the boxes. There is less of this in the outside purifier.

Fourth: Low construction cost of concrete purifiers.

Fifth: The boxes being even with the ground, the shovelling out of the boxes required little labor and the filling them was a matter of either pushing the oxide in, or dumping it from a truck.

Lastly and most essential of all was the life of the oxide when working at an even temperature (about 60 degrees) the year round. This made the oxide last longer, as well as the fact that the activity of the oxide was more effective than in the case of a box entirely outside and subject to freezing temperatures.

We first made an excavation large enough to hold the two purifiers and an 8 way Gas Machinery valve in the center. Then we placed the cast iron mains in the bottom and poured concrete under and all around them so that they were thoroughly embedded, laying the floor of both purifiers and floor for the 8 way valve room in the center.

We erected forms on all sides and ends almost to the ground level, leaving just enough space for the cover and an outside plate between the purifier tops and the street surface. Also an additional form was set in the larger form, which made the 32 inch water seal for the purifier covers. In the purifier boxes a two inch concrete ledge was included to hold the purifier trays.

The 8 way valve was set in the center and connected to the inlet and outlet piping and to both inlets and outlets of both purifier units. The pouring of the concrete was done after the proper amount of reinforcing rods were placed in the forms and was allowed to stand for several days to dry.

The top covers for both purifiers were welded to a 32 inch curtain on sides and ends which dropped into the water seal as the top was lowered.

Our General Electric centrifugal water sealed gas boosters operated at a pressure of 27 inches water column with a capacity of 100,000 cu. ft. per hour. Block and tackles on traveling frames were used to raise and lower the covers.

When the job of filling the boxes and lowering the covers was completed, the surface could be used for temporary open storage.

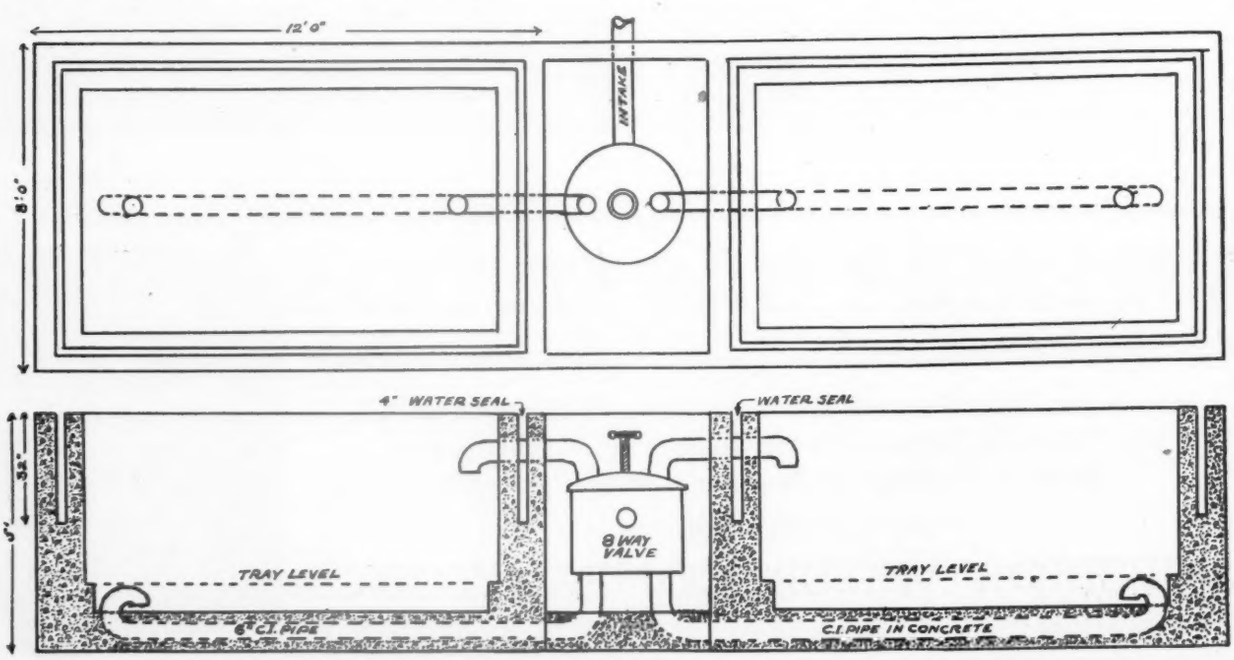
The water seal was provided with steam coils as a precaution, but heating was not needed even in the severest cold weather.

Operation was maintained at even temperatures; unloading and loading of boxes required but little supervision and the men worked in the open air.

I believe that underground installations for gas purification can be effectively and economically operated particularly in the colder zones and in plants that operate during the day only.

The elevated boxes with drop bottoms and mechanical loaders are preferable for plants operating 24 hours a day.

Plan and elevation of two underground water-seal purifiers with covers removed. Steel plates over lids are flush with ground level. C.I. pipe for inlets and outlets embedded in concrete. Trays rest on concrete ledges.



GAS METERS

ARMY E NAVY

RADAR

Lambert Meter Co.
Plainfield, N. J.

COMPLETE GAS PLANTS
INDUSTRIAL FURNACES

•

Automatic Water-Gas Controls
Hydraulically-Operated Valves
for Air, Gas, and Steam

•

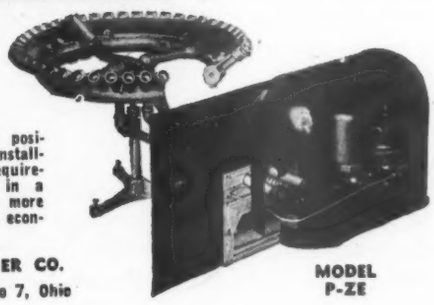
The GAS MACHINERY CO.
CLEVELAND, OHIO

COLUMBIA CONVERSION GAS BURNERS

FOR WARM AIR FURNACES AND HOT WATER, STEAM AND VAPOR BOILERS

NU-TYPE ductless burner that performs perfectly with natural, manufactured or mixed gas.

Popular with scores of utilities and thousands of home owners. Simplifies problem of converting to gas Tamperproof controls, quiet operation, high efficiency, positive performance. Easily installed. Negligible service requirements. Each installation in a neighborhood sells many more because of its simplicity, economy and ease of control.



MODEL P-ZE

COLUMBIA BURNER CO.
729 Ewing St., Toledo 7, Ohio

LAVINO Activated Oxides are made specifically for maximum sulphur removal. Their capacity and activity are *controlled* factors—so that performance is thorough, uniform every time. Maximum trace removal and shock resistance. For loads of all sizes, from traces to the heaviest.

Supplied in two forms:

***Unmixed:* ready for mixing with your own carrier. Lavino Activated Oxide is readily adaptable to your own plant—whatever its size or requirements.**

***Sponge:* furnished ready-mixed, carefully coated on large, tough, specially selected shavings.**

Lavino Activated Oxides are distinguished by a special Lavino process to minimize the formation of mold or other fungus growth.

LAVINO ACTIVATED OXIDE — MAXIMUM H_2S REMOVAL PER LB. OF OXIDE

E. J. LAVINO and Company

1528 WALNUT ST., PHILA. 2, PA.

New Equipment

Pressure Switch

Designed especially for long reliable life this pressure switch is rugged and accurate. Features include sealed-in snap action switch approved by Underwriter's laboratory for electrical loads up to 6 amperes at 64 volts D.C. and 10 amperes at 110 volts A.C. Pressure adjustment can be securely locked and sealed against tampering. Direct wire connections are made through the grometed opening in the steel cover to the insulated terminals to eliminate spliced wires.

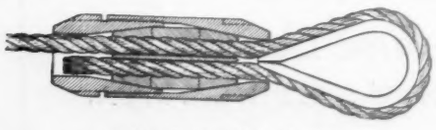
Pressure Switch

Diaphragm is of Fairprene to withstand wide changes in temperature. A mushroom shaped plate of restricted travel prevents stressing of diaphragm. Large area of diaphragm and switch action assure close differentials. Full ⅛" inlet prevents clogging. Husky mounting bracket can be adjusted to meet individual requirements of cable connection. Snap action switch can be changed to normally-off or normally-on by moving one wire. All parts are rustproof. Pressure ranges up to 150 lbs. P.S.I.

Manufactured by The Nason Company, 7663 Epworth Blvd., Detroit, 4, Mich.

Wire Rope Clamp

A new wire clamp called Cabl-Ox has been developed by the Nunn Manufacturing Company, 2125 Dewey Ave., Evanston, Illinois.



"Cabl-Ox" Cable Clamp

This clamp, incorporates a new and exclusive wedging action in its component parts. The unit is alloy steel, cadmium plated for weather protection, streamlined for neat appearance and freedom from obstruction. Easily assembled by unskilled labor and readily disassembled for the tightening of stretched lines or other uses. Made in all standard sizes from 1/16" to ¾".

Illustrated folder describing the product available on request.

Air Separator

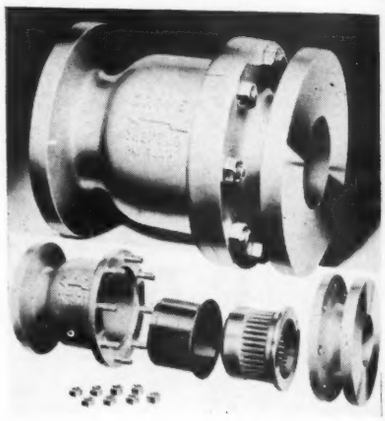
Under trade name "Airfuge," a new separator for removing moisture, oil, scale, etc., from compressed air is announced by The Swartwout Co., 18511 Euclid Ave., Cleveland 12, Ohio. Utilizing the centrifugal principle, it features simplicity of construction and operation and highly efficient separation.

Air entering the inlet is diverted positively to the inner wall of the round body and unwanted substances whirl out of the air stream and drain to the bottom. The cleaned air may be taken off horizontally or vertically from pipe-tapped ports. An integral float-operated trap releases condensate automatically. Separator is made of high-tensile iron; interior parts of corrosion-resisting materials. Bottom easily removed if necessary for cleaning. Made in three sizes for varying capacities and with a range of pipe connection sizes. Bulletin S-13 describes it.

"Airfuge" Separator

Grove Check Valve

The Grove Chexflo Valve is designed for simplicity and safety. Operation is effected by a synthetic rubber tube, stretched over a slotted, cup-shaped metal core, which expands to open and contracts to close. Due to the fact that this expansible tube closes instantly on balanced flow, prior to the commencement of back flow, there is no tendency to establish pressure impulses, shock or water hammer through the flow line. The flexive tube, possesses a uniform and constant spring rate which avoids inertia being set up to cause operation beyond flow requirements. This unit is particularly suited for handling highly corrosive and erosive air, gases or liquids. Full details in Bulletin 610 are available through Grove Regulator Company, 6483 Green Street at 65th, Oakland 8, California.



Grove Chexflo Valve

Diaphragm Pressure Switch

Originally designed to automatically control the intercooler flap on

Aerotec Pressure Switch

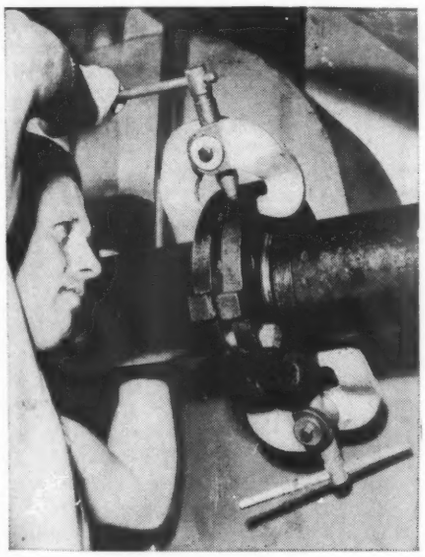
and Appliances

fighter planes, this exceptionally sensitive diaphragm pressure switch is now available for other applications.

Specifications received from the Aerotec Company of White Plains, New York, show a sensitivity of 1/100 of an inch of water on stationary applications.

Tool for Gasket Renewal

This new tool opens pipe flanges for gasket renewal—quickly, easily, and safely. Eliminates the hazardous hammer and chisel method. With Flange-Jacks, pipe flanges may be opened or closed without damage to flange faces, and without danger from sparks—an important factor when working on inflammable lines or in presence of gas fumes. Danger to personnel from chips and flying wedges is also eliminated.



Flange Jack For Pipe Lines

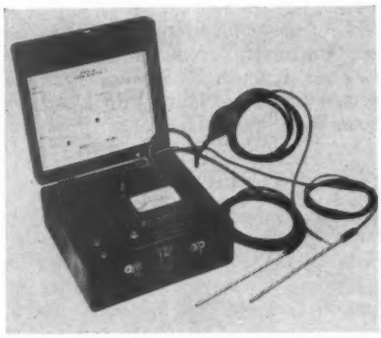
Flange-Jacks operate with a minimum of labor—important in tight, cramped locations. They exert pressure smoothly and evenly—eliminating vibration along the pipeline and the possibility of causing new leaks in nearby joints. Capable of opening joints against a load of 15 tons—without damage to the flanges.

Simple in design, jaws are heavy, one piece steel forgings; screw points are case hardened. Standard sizes open all 2" to 20" flanges and hold them in alignment.

Made by T. G. Persson Company, 224 Glenwood Avenue, Bloomfield. New Jersey.

Stack Gas Analysis

The Davis Emergency Equipment Co. Inc., 45 Halleck Street, Newark 4, N. J., announces a new small portable instrument, known as the



Stack-O-Meter, (Exclusive license—Wm. O. Heblek Co. Patents) for indicating CO_2 stack temperature and draft readings.

All readings are taken on one meter. CO_2 percentage readings are obtained from gas samples collected through a hand aspirator bulb. Stack temperatures are read on the same dial, obtained electrically from a thermocouple mounted in the gas sampling tube. Draft measurement is obtained through a separate tube, but read on the same meter.

The meter dial reads 0 to 20% CO_2 in black figures, temperature on a red scale 0 to 1000°F. and draft in tenths of inches of water on a green scale.

A safety switch automatically shuts off battery current on closing the cover of the instrument box.

Sampling hose, hand aspirator, thermo couple sampling and draft sampling tubes all located in the one case. Case is 12" x 13" x 5". Weight of case with complete instrument is 11 lbs.

Electrically operated, the only maintenance is that of an occasional replacement of batteries, which are of the standard flashlight type. Further details on request.

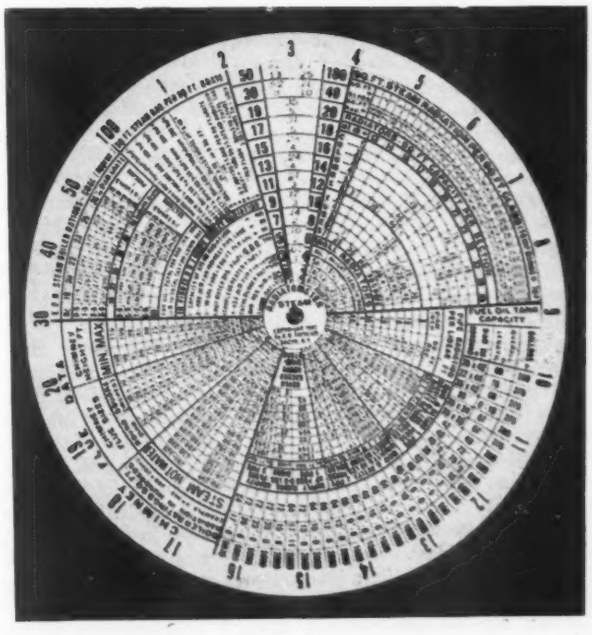
Rapid Heating Calculator

A new calculating device for measuring radiation for steam and hot water heating systems is now available after several years of research and use by heating authorities.

This device, "Heat-O-meter" consists of a round dial 6¼" dia., with two concentric celluloid printed discs to determine the correct amount of radiation, and can be used by anyone without previous technical training. Its operation is rapid, not involving subtractions, divisions, complicated multiplication, nor the use of a formula. A simple turn of a dial and the correct answer is given.

The dial includes sizes of mains, returns, risers, radiator sizes and capacities, round and sectional boiler net ratings, chimney flue sizes and capacities with minimum and maximum heights. Also hot water tank sizes and capacities, fuel oil tank sizes and capacities, hot water generator capacities and other valuable heating information for plumbers, steamfitters, architects, builders, burner and heating salesmen.

Additional information may be obtained by writing to *American Gas Journal*, New York.



Heat-O-Meter

News of the Gas Industry

Home Study Course on Natural Gas

For some years the University of Kansas at Lawrence, Kansas, has been conducting a Home Study Course on Natural Gas. This course is primarily for persons engaged in the industry who wish to extend their knowledge while still actively employed. It is especially helpful to the younger men whose opportunities for experience have been limited, but it covers the fundamentals of the various phases of the industry to such an extent that it has proved valuable to seasoned executives. Its subject matter covers the whole field of natural gas operations, from origin to utilization.

This course was proposed by the American Gas Association about fourteen or fifteen years ago, and after much consideration the University of Kansas was asked to prepare a text and to conduct a course through its extension division. The text was published in 1934 and the course has been in continuous operation since that time under the personal supervision of Professor C. M. Young. The material of the text was reviewed and criticised by an advisory Committee of the A.G.A., composed of eminent specialists in different phases of the gas industry. Considering the fact that the industry changes constantly, and no revision of the text could keep pace, supplements are prepared from time to time, to keep it up to date. These supplements are sent to all students who have completed the work as well as those currently engaged in it. This course covers the entire industry except company organization, financing and rates; in other words, it deals with the physical aspects of the industry. It consists of twenty-seven assignments some of which have two, and in one case three, sections. Each assignment or section is followed by questions which are to be answered by the students. Students are permitted to submit lesson reports as rapidly as they wish, and each is encouraged to continue the work regularly and systematically. Experience has shown that the course may be completed in as short a period as five months, but the large majority of students require a period extending over the greater part of two years. This necessarily depends on the previous preparation of the student and the amount of time he is able to devote to study.

The cost of the course to individual members and to employees of member companies of the American Gas Association, as well as to all residents of the state of Kansas is $54.00. For all others, the fee is $72.00, payable in advance; or $74.50 on a time payment plan.

Enrollments are accepted at any time. Application blanks and any further information desired will be gladly furnished by either the University Extension Division, University of Kansas, Lawrence, Kansas, or Kurwin R. Boyes, Secretary, American Gas Association, 420 Lexington Avenue, New York 17, N. Y.

Nat. Gas and Oil Reserves

Addressing the annual meeting of the Western Oil & Gas Association at Los Angeles on December 19, Wesley E. Disney, Washington representative of the organization declared that America's oil reserves now total 22 billion barrels.

Natural gas reserves, he stated, are estimated at 140 trillion cubic feet, having increased two-thirds in the past five years.

Mr. Disney asserted that during the war oil discoveries totaled 8,200,000,000 barrels while consumption was 9,800,000,000, this reducing the reserves by 1,600,000,000 barrels. About 85% of the wildcat wells drilled proved to be dry holes, he reported.

Mr. Disney declared that more oil must be discovered in this country or the importation of oil is the only alternative faced by the oil industry, which, he said, has an equally serious effect on the gas industry which uses so much natural gas for distribution in many sections of the country.

Savannah-St. Augustine Gas Co. to Change Title

The Georgia Public Service Commission has authorized the Savannah-St. Augustine Gas Company to form a new company for the acquisition of gas properties in Florida.

Under the reorganization plan the company will acquire the Sanford and Orlando plants of the Florida Power Company and issue securities totaling $1,210,000.

The new name of the company will be South Atlantic Gas Company. H. Hansel Hillyer is president of the Savannah-St. Augustine Company.

Duguid Manager Jacksonville Gas Corp.

W. Harold Duguid has been appointed vice president and general manager of Jacksonville Gas Corporation, according to an announcement by William J. Walsh, chairman of the corporation's executive commtitee. He replaces Alva F. Traver, who has resigned but will remain in the organization as a member of the board.

Duguid has been a resident of Jacksonville for 35 years and for 18 years has been employed by Jacksonville Gas. He has served in every department including sales and service as well as at the plant. He was formerly sales manager and assistant general manager.

Pennsylvania Natural Gas Men's Assn. Elects Officers and Directors

At the annual business meeting of the Association, held in the William Penn Hotel, Pittsburgh, January 16, the following officers and directors of the Association for the year 1946 were elected:

President: B. D. Phillips, T. W. Phillips Gas & Oil Co., Butler, Pa.

Vice-President: E. M. Borger, The Peoples Natural Gas Co., Pittsburgh.

Secretary: B. H. Smyers, Jr., 435 Sixth Avenue, Pittsburgh.

Treasurer and Asst. Secretary: P. L. Kesel, 1015 Frick Bldg., Pittsburgh.

Executive Secretary: Mark Shields, 2619 Grant Bldg., Pittsburgh.

Directors: C. E. Bennett, Manufacturers Light & Heat Co., Pittsburgh; E. M. Borger, The Peoples Natural Gas Co., Pittsburgh; E. J. Egan, Manufacturers Light & Heat Co., Pittsburgh; H. D. Freeland, Union National Bank, Waynesburg, Pa.; D. P. Hartson, Equitable Gas Co., Pittsburgh; J. H. Isherwood, Allegany Gas Co., Port Allegany, Pa.; Dan S. Keenan, Carnegie Natural Gas Co., Pittsburgh; B. D. Phillips, T. W. Phillips Gas & Oil Co., Butler, Pa.; H. H. Pigott, Equitable Gas Co., Pittsburgh; S. C. Preston, The Peoples Natural Gas Co., Pittsburgh; G. E. Welker, United Natural Gas Co., Oil City, Pa.

Honorary Directors: T. B. Gregory, Union Heat & Light Co., Pittsburgh; F. F. Schauer, Equitable Gas Co., Pittsburgh.

The following committee chairmen were named for the year 1946:

Finance: W. P. Sadler.
Membership: Dan S. Keenan.
Program: Virgil Bowyer.
Technical: Dr. R. W. Miller.

Electrical and Gas Assn. of New York

H. C. Calahan, General Representative, General Electric Supply Corporation, was elected President of the Electrical and Gas Association of New York Inc. at its annual meeting held January 16th. Other officers elected were: First Vice President, T. H. Joseph, President, E-J Electric Installation Co.; Second Vice President, James Boyd, Eastern District Manager, Westinghouse Electric Corporation; Third Vice President, J. W. Walter, President, John W. Walter, Inc.; Fourth Vice President, J. M. Winer, President, Dynamic Electronics-New York Inc.; Treasurer, James A. Sackett, Sales Manager, Kings County Lighting Company; Secretary, C. A. Norton, Sales Manager, Pierce Laboratory Inc.; and Assistant Secretary, H. A. Olson, Manager, Atlantic Sales District Lamp Dept., General Electric Company.

W. Virginia Revises Survey With Return of Personnel

With the return of Dr. Paul H. Price, State Geologist, the West Virginia Geological Survey has almost regained its prewar personnel strength. During the war years over one-third of the staff was on leave, serving with the armed forces or allied services.

Dr. Price held the rank of Lieutenant Colonel in the Army Specialist Corps as Mineral Resource Specialist. After intensive training in the United States and England on Military Government and Civil Affairs, Col. Price served with the British Military Government in France for six months as special advisor on mineral resources, coal, limestone, and ground waters; and for a year in Germany in the G-4 Division of Supreme Headquarters Allied Expeditionary Forces as Chief of Saar Unit of Solid Fuels Section, supervising maintenance and operation of coal mines.

Dr. A. J. W. Headlee, Survey Chemist and Gas Analyst, resumed his duties the first of the year.

Dr. J. L. Hall, assistant to Dr. Headlee, is still on active duty as Lieutenant in the U. S. Navy.

Dr. E. T. Heck, Geologist, returned in December after 2½ years as Lieutenant in the U. S. Navy, having served in Newfoundland, Canada, North Africa, and various parts of the British Isles.

John P. Nolting, Geologist, was called to active duty in 1940. As Lieutenant Colonel, Corps of Engineers, he served for three years in India as District Engineer in Kurmitola, Base Section Engineer in Karachi, and Assistant Base Section Engineer in Calcutta.

Miss Mary Jane Newlon, Librarian, joined the American Red Cross in 1943 and was assigned to the Recreation Division in Calcutta, India.

Dr. Price advises that a new and comprehensive program of survey work is under way.

O.P.A. Approves Delivered Prices on Kitchen Cabinets

Effective December 31, 1945, national retail delivered prices have been approved by OPA Order Number 4801, under MPR 188, on kitchen cabinets and sinks manufactured by the American Central Manufacturing Corporation, Connersville, Ind.

The established retail ceiling prices on the individual units in the line are identical throughout the U. S.

This OPA order marks the first time that national retail delivered prices have been established on a line of kitchen cabinets and sinks.

In commenting on the new prices, C. Fred Hastings, General Sales Manager, stated that American Central had made application for national delivered prices in response to the request of many distributors and dealers.

By the approval of national delivered prices, American Central becomes another in the increasing number of kitchen equipment manufacturers who have changed recently from f.o.b. factory to delivered retail pricing policies.

1946 Officers and Directors Oklahoma Utilities Association

President: A. F. Potter, District Manager, The Gas Service Company, Bartlesville.

First Vice President: S. I. McElhoes, Director, Public Service Company of Oklahoma, Chickasha.

Second Vice President: L. A. Farmer, President, Northern Oklahoma Gas Company, Ponca City.

Treasurer: E. C. Joullian, President, Consolidated Gas Utilities Corporation, Oklahoma City.

Secretary: Miss Kate A. Niblack, 625-626 Biltmore Hotel, Oklahoma City.

Directors elected for 3-year term: Glenn C. Kiley, Vice President, Oklahoma Gas and Electric Company, Oklahoma City; Frank B. Long, Vice President, Oklahoma Natural Gas Company, Tulsa.

Directors elected for 1-year term: E. C. Joullian, R. K. Lane, President, Public Service Company of Oklahoma, Tulsa; S. I. McElhoes, J. Y. Wheeler, Oklahoma Manager, Lone Star Gas Company, Ardmore; W. L. Woodward, President, Zenith Gas System, Inc., Alva.

Directors—Hold-overs: L. A. Farmer, J. C. Happenny, President, Oklahoma Power and Water Co., Sand Springs; A. F. Potter, W. R. Thomas, Oklahoma Manager, Southwest Natural Gas Company, Ada.

D. S. Kennedy, Vice President and Treasurer, Oklahoma Gas and Electric Company, Oklahoma City, is the retiring President of the Association.

Home Builders Exposition

Chicago will be the setting February 25-28 of the largest home building exposition that has ever been presented in America, according to Paul S. Van Auken, Convention and Exposition Director of the National Association of Home Builders.

With the huge exposition hall of the Stevens Hotel as a setting, more than 160 exhibitors will play host to at least 5000 builders, architects, realty dealers and mortgage bankers. The exhibitor list, a veritable "Who's Who" of the building industry includes: American Gas Association, American Radiator and Standard Sanitary Corp., Bryant Heater Co., Chrysler Airtemp Div., Crane Co., Johns-Manville, Minneapolis-Honeywell, Mueller Furnace Co., C. A. Olson Co., Owens-Corning Fiberglas Co., Roberts & Mander Stove Co., Servel, Inc., A. O. Smith Corp., Surface Combustion Corp., White-Rodgers Electric Co.

This exposition will blueprint the home planning for tomorrow. "Every effort will be made to show how the moderately priced home can be achieved in attractive architectural design," Van Auken explained. The convention sessions will be compact studies of opportunities and problems confronting the industry. They range from topics dealing with job opportunities for returned veterans to building financing, and the vital housing problem for all America—the most widely discussed "must" program of today.

CONVENTION CALENDAR

February

11 *Federal Power Commission Hearing,* Biloxi, Miss.

19 *Federal Power Commission Hearing,* Chicago, Ill.

18-19 *Technical Conference on Domestic Gas Research,* Cleveland.

March

11-12 *Oklahoma Utilities Assn.* Annual Convention, Biltmore Hotel, Oklahoma City.

19 *Federal Power Commission Hearing,* Charleston, W. Va.

21-22 *New England Gas Association,* Annual Business Conference, Hotel Statler, Boston.

21-22 *Southern Gas Association,* Galveston, Tex.

29-30 *American Gas Assn.* Conference on Industrial and Commercial Gas, Commodore Perry Hotel, Toledo, Ohio.

April

8-10 *Mid-West Gas Association.*

16-18 *A.G.A.* Distribution and Motor Vehicle Conferences, Hotel Stevens, Chicago.

23-25 *Southwestern Gas Measurement Short Course,* University of Oklahoma, Norman, Okla.

May

7-8 *A.G.A. Natural Gas Department,* Annual Spring Meeting, Cincinnati, Ohio, Gibson Hotel.

7-9 *Pennsylvania Gas Assn.* 38th Annual Meeting, Wernersville, Pa.

7-9 *National Association of Corrosion Engineers,* Annual Meeting and Convention, President Hotel, Kansas City, Mo.

17-24 *International Petroleum Exposition,* Tulsa, Oklahoma.

June

3-5 *American Gas Association Joint Production and Chemical Committee Conference,* Hotel Pennsylvania, New York.

18-21 *Canadian Gas Association,* 39th Annual Convention, Manor Richelieu Hotel, Murray Bay, P. Q., Canada.

October

7-11 *American Gas Association,* Annual Meeting, Atlantic City, N. J., Convention and Exhibition.

American Gas Association Activities

A. G. A. Midwest and Southwest Personnel Conference

The eighth meeting of the American Gas Association Personnel Conference was held at the Hotel Fontenelle, Omaha, Nebraska, on January 9. Mr. C. C. Jolley, Personnel Director of the Natural Gas Pipeline Company of America, elected Chairman of the Conference last November, presided for the first time. The Conference was well attended by executives in charge of industrial relations of the gas companies of that area.

In opening the meeting Chairman Jolley reviewed the activities of the group since its formation in October, 1944, reviewed general trends in personnel management and outlined the problems ahead which indicate an even greater need for the group in the future.

The handling of returned veterans was the first subject discussed. All companies represented reported about 90 per cent of their employees in the armed services had returned and most of them have been placed in better jobs. The men are returning with enthusiasm and valuable experience. A few unusual situations were outlined and discussed.

Problems in connection with the return of the normal work-week were keenly discussed in light of general developments. The employee benefit policies of the various companies were reported and discussed. The trends in contract negotiations were interestingly revealed as evidenced from recent experiences of those present.

The Conference decided to hold four additional meetings in 1946—in March, June, September, and November. The next meeting is to be held in March at the Phillips Hotel in Kansas City, the exact date to be announced. Further information can be secured from C. C. Jolley, Personnel Director, Natural Gas Pipeline Company of America, 20 North Wacker Drive, Chicago 6, Illinois.

The American Gas Association Southwest Personnel Conference held its eleventh meeting in New Orleans on January 11. Mr. H. D. Carmouche, elected as Chairman of the Conference on June 5, presided. Arrangements for the New Orleans Conference were made by W. H. Senyard, Director of Personnel of the Louisiana Power & Light Company. Mr. Kurwin R. Boyes, Secretary of the American Gas Association, opened the Conference with some observations on the general situation and offered several suggestions on the conduct of the Conference which were favorably received.

Considerable time was profitably devoted to the reporting and discussion of problems arising out of a return to a normal week and contract negotiations. No particular difficulty in satisfactorily placing employees returned from the armed forces was reported. Some recently developed employee retirement and thrift plans were reviewed for the information of those present. A discussion of supervisory training plans and pre-employment testing for job assignment disclosed some interesting observations and information. Plans for the next Conference will be announced by the Chairman, H. D. Carmouche, General Superintendent, Houston Pipe Line Company, Houston, Texas.

A.G.A. at National Restaurant Exposition

The American Gas Association is sponsoring The Commercial Gas Cooking Center at the first postwar Exposition of the National Restaurant Association. This 27th Annual National Restaurant Convention and Exposition will be held on March 26, 27, and 28, at the Hotel Stevens in Chicago.

The National Restaurant Exposition has always been attended by a large number of commercial gas men and manufacturers' representatives of commercial gas cooking equipment who find this Exposition an excellent opportunity to make close contacts with their customers. Those who attend the Exposition will have the opportunity of seeing the latest in commercial gas cooking equipment and in the other gas fired appliances suitable for use in restaurants for the purpose of water heating, dishwashing, sterilizing and other purposes.

The Commercial Gas Cooking Center will be an exhibit space fitted up as a lounge to provide a pleasant gathering place for renewing old acquaintances and meeting newcomers in the food service industry.

Thorp Heads Laboratories Research Staff

Promotion of Chester A. Thorp of the American Gas Association Testing Laboratories to the position of Chief Engineer of Research was announced this month by R. M. Conner, Laboratories Director. Mr. Thorp's promotion establishes an overall supervision of all Laboratories' research activities as part of the expansion program now underway in connection with reconversion to regular peacetime operations.

Well known as a utilization engineer, Mr. Thorp came to the Laboratories in October following his release from the Navy as a Lt. Commander. He formerly headed the Gas Appliance Laboratory jointly maintained by Southern California Gas Company and Southern Counties Gas Company of California.

In his new capacity, Mr. Thorp will have charge of all research activities at the Cleveland and Los Angeles Laboratories.

Service Men Return to Laboratories

Ten former members of the American Gas Association Testing Laboratories staff serving in the armed forces have been released and have returned to their positions, augmenting the present staff and making possible expansion of testing and research activities undertaken as the result of increasing appliance manufacturing. Eight have been employed at the Cleveland Laboratories and two at the Los Angeles Laboratory.

Those returning to Cleveland are: Major Bruce A. McCandless; Naval Lt. Walter B. Kirk; Captain Robert T. Hlavin; First Lts. Howard L. McPherson, Donald F. Leverett, Frank E. Hodgdon, and Carl F. Geltz and Staff Sgt. William R. Willes. Captain John J. Kavanaugh and Technical Sgt. David G. Willich have returned to Los Angeles.

New Research Bulletin on Gas Mixing on Press

Release of important technical data helpful to the gas industry in meeting winter peak load demands is to be made in the near future, according to the Mixed Gas Research Committee of the American Gas Association, a joint committee of the Natural Gas Department and the Technical Section. The new information will be supplied in the form of a research bulletin of the American Gas Association Testing Laboratories where the work was conducted.

The scope of the study includes substitution of gases with heating values ranging from 800 to 1800 Btu per cubic foot for three different selected natural gases representative of those commonly distributed. They may be identified as (1) high heating value, (2) high methane, and (3) high gravity combined with high inert natural gas respectively.

New interchangeability equations have been developed for determining limits of flash-back, lifting and yellow tipping when natural gas is employed as the base gas. Expected to be of considerable interest to utilities is the development of a method of calculating formula factors and evaluating gases, formerly complicated and time-consuming. This has been simplified by the provision of calculation sheets requiring only simple mathematics. Their use makes it possible for operators to evaluate possibilities of interchange of specific gases directly without previously having a thorough knowledge of the basic theories involved or complete familiarity with the textual content of the new bulletin.

The new equations supplement previous mixed gas research studies which were devoted principally to substitutions for manufactured gases and were subject to verification on a representative group of control appliances under extreme conditions of utilization.

New A.G.A. Research Technical Advisory Group Formed

F. M. Banks, chairman of the Committee on Domestic Gas Research has announced the recent formation of a technical advisory group known as the Technical Advisory Group for Burners, Controls and Accessories Research to develop and supervise new domestic gas research projects

in the burner and accessories field under the chairmanship of Dr. William R. Hainsworth, Vice President in Charge of Engineering, Servel, Inc. The members of this new group which held its first meeting in December are: Philip S. Harper, Harper-Wyman Company, Chicago; B. A. Johnson, Minnneapolis-Honeywell Regulator Co., Minneapolis; Dean Olds, The Coleman Lamp & Stove Co., Wichita, Kan.; Paul Sagar, General Controls Company, Cleveland; Lyman M. Van der Pyl, Pittsburgh Equitable Meter Company, Pittsburgh; and C. C. Winterstein, The Philadelphia Gas Works Company. The active projects over which this group has assumed supervision are:

Project DGR-1-B Research in development of 100% primary air atmospheric injection gas burners.

Project DGR-2-B Research in the effect of ambient temperatures on primary air injection, flame, and other gas burner operating characteristics.

Project DGR-3-B Research in design methods of preventing closure of gas pilot burner primary air openings by dust and lint.

Project DGR-4-B Investigation of extent of gas flame impingement allowable for satisfactory combustion.

Project DGR-5-B Research in pilot design, construction and performance.

Project DGR-6-B Research in fundamentals of noise of extinction of large gas burners.

A.G.A. Conference On Domestic Gas Research

The Technical Conference on Domestic Gas Research of the American Gas Association being held at Hotel Statler, Cleveland, February 18 and 19, is specifically for engineers and other technical personnel of gas companies and appliance manufacturing companies.

There will be technical and semi-technical illustrated papers on the various research projects of the Committee on Domestic Gas Research and other activities in the general field of domestic gas research. At the general sessions papers will be presented by representatives of the A.G.A. Testing Laboratories which will cover the technical high-lights of the research work that has been done recently on the active projects. These presentations will include work done in the fields of Gas Cooking Research, Gas Burner and Pilot Research, Gas Water Heating Research and Gas House Heating Research. In addition to papers by the Laboratories personnel, a representative of the Case School of Applied Science will present a paper on "An Analysis of the Corrosion Problem in Gas Water Heaters." A paper will be presented on "Corrosion in Gas Furnaces and Boilers—The Problem and Approaches to its Solution." This problem has been assigned to Battelle Memorial Institute. A special feature of the Conference will be a motion picture on humidity conditions and condensation in homes which will be presented by the Housing Research Division of Purdue Research Foundation. Another presentation by a Purdue representative will be a paper on "Research Problems in Venting Gas Heaters."

Luncheons during the two day conference will be addressed by E. J. Boothby, President, American Gas Association, and Lyle C. Harvey, President, Gas Appliance Manufacturers Association.

The afternoon individual panel sessions embrace the activities of the several technical advisory groups of the Committee on Domestic Gas Research. They will be conducted by the respective chairmen of each group:

Technical Advisory Group for Domestic Gas Cooking Research,
Charles M. Mayer, Acting Chairman, The Tappan Stove Co.

Technical Advisory Group for Domestic Gas Water Heating Research,
L. R. Mendelson, Chairman, The Hotstream Heater Co.

Technical Advisory Group for Central Gas Space Heating Research,
Keith T. Davis, Chairman, Bryant Heater Company.

Technical Advisory Group for Direct Gas Space Heating,
E. C. Adams, Chairman, Adams Bros. Mfg. Co.

Technical Advisory Group for Burners, Controls & Accessories Research,
Dr. William R. Hainsworth, Chairman, Servel, Inc.

Proposed Plant for Gasoline from Natural Gas

United Gas Corp. has applied to the Securities and Exchange Commission for authority to acquire certain securities of the Carthage Hydrocol Inc.

According to the application, Carthage Hydrocol, Inc., proposes to build a plant near Brownsville, Tex., the initial cost of which is expected to be approximately $14,000,000, to manufacture gasoline from natural gas by the use of a process known as the Hydrocol process.

The plant is being designed for a capacity of processing approximately 60,000,000 cubic feet of gas a day, with a resulting calculated production of approximately 5,900 barrels of gasoline with a relatively high octane rating, and 1,100 barrels of Diesel fuel oil and other oils.

The application disclosed that approximately one-half of the original cost of the new plant, a figure somewhere between $7,000,000 and $9,000,000 would be borrowed from the Reconstruction Finance Corp. and secured by a first mortgage on all the present and future properties of Carthage Hydrocol, Incorporated.

Oil and Gas Resources in the Orient

A source of crude oil in China has been developed in the Yumen field on the Shihyouho River in Kansu Province, North China. The field is some 2000 miles from the seacoast and 450 miles from Lanchow, capital of Kansu Province. It is 8200 feet above sea level on the southern edge of the Gobi Desert.

The Yumen field was discovered in 1939, when the National Resources Commission started the drilling of a test well near oil seepages along the Shihyouho, which had been known for 2000 years, in order to provide urgently needed oil after the Japanese had blockaded all the Chinese ports. The drill struck oil at 500 feet.

The field is now producing 4000 barrels per day from 25 wells at the 500-foot and 1400-foot levels to supply a small refinery which was built to process this crude. It is expected that large-scale production eventually will be developed in the Yumen field. Other areas of the country show promise of additional important oil deposits and will be fully explored.

Formosa, which had been held by the Japanese for some 50 years is known to possess rich deposits of natural gas. Oil production and refining facilities may have been developed by the Japanese.

Two Universal Oil Products Co. engineers, Dr. Gustav Egloff and W. B. Shanley, leave by air for China to make a preliminary study and to recommend steps to be taken to:

(a) Improve the operations of refineries now running.

(b) Place in operation refineries now operable.

(c) Effect repairs, replacements and modifications required to place damaged refineries in service.

(d) Coordinate and expand refining facilities for present and future regional and national needs of China.

Edison Medal Award

The New Jersey Utilities Association announces that the Edison Medal for 1945 has been awarded to Philip Sporn, Executive Vice President of the American Gas & Electric Service Corporation, for his "contributions to the art of economical and dependable power generation and transmission."

Mr. Sporn received his engineering education at Columbia University. He joined the engineering staff of American Gas and Electric Company in 1920 and became chief electrical engineer in 1927. In 1933 he was made chief engineer of the American Gas and Electric Company and all associated companies, and in 1934 elected Vice President of the American Gas and Electric Company in charge of all engineering. With the formation of the American Gas and Electric Service Corporation on January 1, 1934, Mr. Sporn was elected Vice President of that Corporation in charge of all engineering activities.

Cassidy Is Vice-President Of Consolidation Coal Co.

Appointment of Samuel M. Cassidy as vice-president of Consolidation Coal Co. in charge of its Kentucky operations became effective Feb. 1.

Mr. Cassidy resigned as vice-president of Weirton Coal Co. to take the post and will have headquarters at Jenkins, Ky.

Consolidation announced Mr. Cassidy will become the president of a new company to be incorporated soon and operate the Kentucky properties.

"I'd Like to Ask a Few Questions about 'CP' Gas Ranges!"
Q. Attention, Mr. Appliance Dealer! Will you give me a little range education?
A. Gladly, Mrs. Homemaker! What's on your mind?
Q. What does "CP" mean, anyway?
A. That's a question everyone is asking!—The trade mark CP is the stamp of approval found on gas ranges that have been built to unusually rigid standards. If your range is marked CP, you can be most certain of cooking perfection!
Q. Then "CP" is NOT the name of a range?
A. No—it's used in addition to a brand name. Some 20 manufacturers will be producing CP gas ranges.—All CP ranges will be pre-tested and approved before they are delivered to the dealer.
MORE SPACE NEEDED
Q. What's so outstanding about a CP gas range?
A. Wish we had the space to list all the advantages! Here are a few: Top burners and oven light automatically; top burners have three speeds; and if you wish, an automatic clock control will turn your oven on and off, even though you're miles away!
Q. But won't a CP gas range cost a "barrel" of money?
A. No indeed! They cost but little more than standard gas ranges of good quality. And you'll have the satisfaction in knowing that your modern gas range will last a long, long time.
Q. All the girls in my club are "range conscious"! When shall I tell them they can see this new CP gas range?
A. Any time now. In coming months numerous manufacturers will be releasing CP gas ranges. We're as anxious as you are!
THE GAS CO.
THE GAS APPLIANCE DEALER
Q. And WHERE can we buy a CP range?
A. At The Gas Company or other dealers of high quality gas ranges.
DON'T MISS
The Junior Cooks' Breakfast Club On The Air — Every Saturday. Consult your local paper for time and station.
THE OHIO FUEL Gas Company
Where there's a choice— Gas is preferred!

THE MEANING OF "CP" EXPLAINED IN CARTOON

The Ohio Fuel Gas Company used the above newspaper copy, 5 columns wide, as part of their January advertising campaign. Featuring CP gas ranges, this novel presentation adopts the conversational principle boardering on the comic strip style to assure attention.

Roper Adds to Sales Staff

The following additions to the Geo. D. Roper Corp., sales staff have been announced.

Morton B. Kammerer, will be working with vice-president W. J. Foster in territory which includes the District of Columbia, Virginia and West Virginia.

Morton B. Kammerer

Reynolds R. Davis

Dan Sullivan

From 1931 until 1942, Mr. Kammerer gained a rich background of experience in household appliance sales work. During the last nine and a half years of this period, he was affiliated with the Washington Gas Light Company, Washington, D. C. From February 8, 1937, until late 1942 he was manager of the retail Refrigeration and Range Division of the sales department.

Reynolds R. Davis has recently been appointed district representative with headquarters at Lubbock, Texas. In covering west Texas and New Mexico, he will work under the supervision of J. C. Mansfield out of the Dallas office. Since Mr. Davis was raised in the panhandle of Texas and is thoroughly familiar with west Texas, he will be right at home in this territory.

Dan Sullivan recently joined the Geo. D. Roper Corp. in Los Angeles, where he will work with H. Hall. During the war, Mr. Sullivan worked for three years at the Lockheed Company as mechanic and service liaison. Prior to this, he was affiliated with the Southern Counties Gas Company in the Public Relations Department.

Demmler with Research Dept. Ketchum, MacLeod & Grove

Lt. Louis F. Demmler, USNR, on leave from Ketchum, MacLeod and Grove, Inc., Pittsburgh advertising agency, has returned to become director of the agency's research and merchandising department. He joined KM&G in 1939 as director of its gas appliance promotion division.

T. C. Wescott Appointed Pres. Ebasco Services Inc.

Electric Bond and Share Company, New York, announces the appointment of T. C. Wescott as President of Ebasco Services Incorporated its service subsidiary. Mr. Wescott succeeds S. R. Inch who becomes Vice Chairman.

T. C. Wescott

Born in Maine and graduating from University of Maine, Mr. Wescott has been with the Bond and Share system in various engineering and executive capacities for 35 years. During this period, he has had extensive business and engineering experience in industrial and utility work both in this country and abroad.

Company officials stated that this appointment was made in connection with the expansion of Ebasco's engineering and technical services to industrial and public utility clients outside the Bond and Share system.

Staff of Field Welding Engineers Increased by Lincoln Electric

In line with its program for expanding the staff of field welding engineers to serve all users of welding, The Lincoln Electric Company, Cleveland, Ohio, announces the addition of the following district office representatives.

Omer W. Blodgett has been appointed welding engineer for the Grand Rapids, Michigan, area.

Frank Boucher has been appointed welding engineer in the Detroit, Michigan, area.

R. K. Kewley has been appointed welding engineer in the Cleveland, Ohio, territory.

G. B. Moseley has been appointed welding engineer in the St. Louis, Missouri, area.

Captain L. J. Cogan, recently released from the United States Army, has returned to his duties as welding engineer in the Philadelphia area, with office at 3938 Market Street.

American-Standard Advertising Program

"American-Standard plans an extensive national advertising program for 1946," according to Mr. H. L. Spindler, Manager of Advertising and Sales Promotion of the American Radiator & Standard Sanitary Corporation. "Advertisements will appear regularly in carefully selected general magazines and farm publications. Advertising in building publications and trade papers will tie in effectively with the campaign conducted in consumer media. Special publications will be used to cover other important markets such as schools, hospitals, hotels, and the marine field."

Mr. Spindler said, "Our advertising will be highlighted by the new Mark of Merit, the striking symbol of fine heating and plumbing displayed on products in the complete American-Standard line. This Mark of Merit represents the sun and water. The sun symbolizes warmth and represents heating; the waves suggest water and represent plumbing. Together they form a Mark of Merit which stands for the family of heating and plumbing products we make.

"Our objective is to give the public one visual symbol by which they can identify everything we make, and to establish this symbol as a recognized standard of quality to buyers of heating equipment and plumbing fixtures. The Mark of Merit will be featured prominently in all American-Standard advertisements during the next several months."

Noma Acquires Refrigeration Corp. of America

Acquisition of Refrigeration Corp. marks the second step in Noma's expansion into the durable consumer goods field.

The company entered the home equipment field in December by purchasing Estate Stove Co., producers of gas and electric ranges.

John Bess will continue to serve as president of Refrigeration Corp. and no change in management or policy is contemplated.

Bendix Appliances Appoints H. A. Hall in Minneapolis

H. A. (Al) Hall has been appointed divisional sales manager for Bendix Home Appliances, Inc., with headquarters in Minneapolis, according to W. F. Linville, sales manager. The division includes Wisconsin, Minnesota, Iowa, Nebraska and the Dakotas.

Mr. Hall has been part of the Bendix picture almost since its inception, having started as a "factory distributor" specialist, training dealers and salespeople in the southern California territory.

He also pioneered in refrigeration, as a retail salesman for the I. K. Stover Co. and advanced to district manager.

Later, Mr. Hall was regional field merchandiser for Montgomery Ward's west coast stores, handling all major appliances and radio.

Rockwell Manufacturing Company Names Marsteller Advertising Head

Wm. A. Marsteller has been appointed General Advertising Manager of Rockwell Manufacturing Co., Pittsburgh, it was announced last month by A. J. Kerr, Vice President of Sales of the Rockwell Organization.

Wm. A. Marsteller

Mr. Marsteller has been Vice President in charge of Sales, Advertising and Industrial Relations of Edward Valves, Inc., East Chicago, Ind., a subsidiary of the Rockwell Manufacturing Co.

He is President of the Chicago Industrial Advertisers Association and a Director of the National Industrial Advertisers Association and the Chicago Federated Advertising Club.

Subsidiaries and Divisions of the Rockwell Manufacturing Co. will continue to program and place their own advertising. Mr. Marsteller's work will be of a coordinating and directing nature.

Milton W. Heath Returns to Tree Service Activity

After nearly four years of service abroad in the armed forces, Milton W. Heath, who originated and developed vegetation surveys for gas companies over a decade ago, has returned to active work again.

During the interim, the Heath Tree Service, Inc., of Wellesley, Mass., has been conducted under the direction of Mrs. Heath.

While abroad, Mr. Heath had opportunity to observe gas company conditions in France, Germany and the Low Countries.

W. S. CADWALLADER

Following retirement as Chicago District Manager for Roper on November 1 last year, W. S. Cadwallader died Dec. 27, at Miami, Florida, age 58 years.

Mr. Cadwallader had been with Roper 19 years. As District Manager, he was in charge of the Metropolitan Chicago Area.

Forty years in the gas industry has made Mr. Cadwallader one of the best known men in the field.

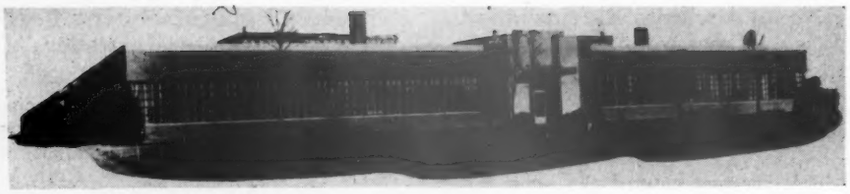
STAMANCO

Sign of ENGINEERING EXCELLENCE

The trade name "STAMANCO" stands for specialized experience . . . leadership in design . . . and finest quality workmanship. In fact, it epitomizes all those desirable characteristics that make for the highest degree of economy and satisfactory operation in gas holders, hi-pressure tanks, and purifiers. Photo at right shows an example of "STAMANCO" engineering excellence--one of our 750,000 cubic foot Wet Seal Gas Holders recently installed at Pittsfield, Mass. This is the FIRST All-Welded Gas Holder permitted to be erected in the State of Massachusetts.

Before you invest in such equipment, it will pay you to talk over your requirements with one of our engineers and get a bid on a "STAMANCO" quality job.

The STACEY MANUFACTURING Co.
SINCE 1851
CINCINNATI 16, OHIO
GAS HOLDERS • HI-PRESSURE TANKS • PURIFIER BOXES
ENGINEERS • FABRICATORS • CONSTRUCTORS
An Independent Organization Not Affiliated With Any Other Builders of Gas Holders



New Factory of Handley-Brown Heater Company at Jackson, Mich.

New Home of Handley-Brown Heater Company

Mr. H. E. Handley, President and General Manager, of the Handley Brown Heater Company, Jackson, Mich., announces the completion of its new factory. The plant is scientifically planned to meet the expanded production program of Handley Brown's gas water heaters and gas conversion burners.

The new factory is an all steel and brick structure of monitor type design. The distinctive front with continuous window construction houses the general offices, engineering, and experimental laboratory. Mr. Handley states that all departments were engineered to insure the best possible working conditions with space layouts, lighting and work areas designed to handle increased processing.

Handley Brown products, while designed for domestic applications, are functional elements in the hot water supply and the heating of the offices. H-B gas conversion burners installed in boilers in the laboratory and the display room provide heat for all but the production area of the factory. In the factory proper, General Gas Light Company's No. 165 space heating units are installed to provide individually controlled heating.

K. L. Dynes, Factory Manager Domestic Thermostat

Domestic Thermostat Co., Los Angeles, has announced the appointment of Kenneth L. Dynes, a national known production executive in the gas appliance field, as factory manager, with complete supervision over production at the company's two plants in Los Angeles.

Mr. Dynes graduated as an engineer from the University of Illinois in 1924 and later took post-graduate work in mechanical and electrical engineering at Carnegie Institute of Technology.

He served 9½ years with Grayson Heat Control, Ltd., Lynwood, Calif., holding the position of vice president.

New Welding Society Award

To stimulate undergraduate interest in welding, funds have been donated by A. F. Davis, of the Lincoln Electric Company, Cleveland, O., for the A. F. Davis Undergraduate Welding Award, which will consist of four cash prizes totaling $700 to be presented annually to authors and publications for the best and second best articles on welding published in undergraduate magazines or papers during the preceding year. Any undergraduate of a college, university, or institute of technology in the United States or Canada is eligible, but the paper must be published in an undergraduate publication. Judges selected by the Educational Committee of the American Welding Society will select the winning paper in July of each year on the basis of originality of the paper and thoroughness in which the subject is covered. The awards will be as follows: $200 each to the author of the best paper and to the publication in which it appears, and $150 each to the author and the publication for the second best paper.

Presentation of the first A. F. Davis Undergraduate Welding Awards for papers published between now and July 1, 1946 will be made at the next annual meeting in October, 1946.

Bastian-Blessing Names French Public Relations Director

The Bastian-Blessing Company, Chicago, has appointed Jerry French Public Relations Director for the Rego division, announced Ellsworth L. Mills, Vice-President of the company.

Mr. French, who has been with the firm for several years, was formerly the publisher of the *Merchandise Mart Review*, a business magazine sponsored by Marshall Field & Co. He will head up a greatly expanded advertising and publicity program for The Bastian-Blessing Company.

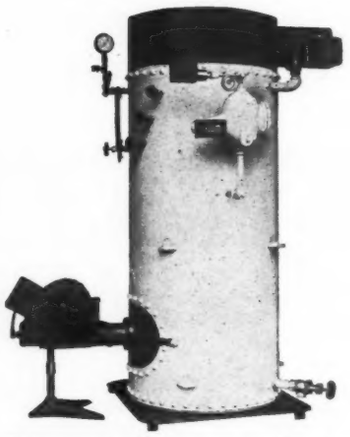
Rockwell Manufacturing Company Acquires Arcade Mfg. Co.

Acquisition of the Arcade Mfg. Co., Freeport, Illinois, by the Rockwell Manufacturing Company of Pittsburgh has been announced by Colonel Willard F. Rockwell, President and Chairman of the Rockwell Company.

Arcade, incorporated in 1885, started as a manufacturer of feed grinders, plows, other agricultural implements and coffee mills. Through the years, the line was extended to include more than 300 items, and gradually the manufacturing emphasis changed to foundry equipment, hardware for the refrigeration industry, and miscellaneous cast iron and wood toys.

Present management of the Company will be continued, except that L. L. Munn, for many years president of Arcade, will retire within the near future.

LATTNER
GAS — OIL BOILER
3 HP to 35 HP.



Burns natural gas or regular furnace oils with equal efficiency using same burner.

P. M. Lattner Mfg. Company
Cedar Rapids, Iowa

CLEVELAND

"A" TYPE METERS
"B" TYPE METERS
DIAPHRAGMS

Cleveland Gas Meter Co.
ESTABLISHED 1875
2009 Rockwell Ave., Cleveland 14, O. Phone CHerry 2351

CONNELLY IRON SPONGE

High in efficiency . . . low in cost. In hundreds of plants throughout the country, Connelly Iron Sponge has proven itself . . the finest purification material on the market. Not only does it lower your purifying cost but its high activity and capacity tends to reduce distribution and service complaints because of the cleaner gas which ultimately lowers operating and maintenance costs

If you have a problem in gas purification, Connelly's 68 years of experience is at your service. Our engineers can help you . . . there is no obligation on your part.

CONNELLY IRON SPONGE & GOVERNOR CO.
ELIZABETH, N. J. LOS ANGELES, CALIF
3154 SOUTH CALIFORNIA AVE., CHICAGO 8, ILL.

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IRON OXIDE

I can supply you with the Crude Bog Iron Ore, used in Coke and Gas plant, as purifier.

WILLIAM VENNES
259 - 6th Avenue
Grand'Mere, Que.
Canada

ENGINEERS WANTED

Wanted—Gas Engineers with experience on design of Carburetted Water Gas Plants and Equipment. United Engineers & Constructors Inc., 1401 Arch Street, Philadelphia 5, Pa.

Gild Activities for 1946

The Gild of Ancient Supplers has completed its 1946 organization and plans two major gatherings: Ninth Anniversary Dinner at Galen Hall, Wernersville, Pa., during the May 21-23 convention of the Pennsylvania Gas Association; and the annual Convocation and Wassail at Atlantic City, at the convention of the American Gas Association.

Plans for both affairs were discussed at a meeting of the Great Council at the Engineers' Club, New York, Jan. 24. Harry A. Grassmann, Inner-Tite Clamp Corp., Elizabeth, N. J., was reelected sergeant-at-arms, and Joseph A. Messenger, Buell Engineering Co., New York, was elected to the newly created office of Master of Revels. Also present were Mayor Joe A. Mulcare, Mulcare Engineering Co., New York; Immediate Past Mayor C. Edwin Bartlett, Bartlett & Co., Philadelphia; Keeper of the Treasure Glenn H. Niles, consulting engineer, Ridgewood, N. J.; and New York Warden J. Albin Johnson, Ruud Mfg. Co., Long Island City, N. Y.

Mayor Mulcare announced appointment of other Wardens as follows: Philadelphia, W. Roberts Cameron, General Coal Co.; Boston, George P. Velte, American Stove Co.; Atlanta, David S. Sharpe, Geo. D. Roper Corp.; Milwaukee, John H. Fagan, J. H. Fagan Co.; Houston, Stephen D. Day, Barrett Co.; and San Francisco, Kenneth C. Tomlinson, American Meter Co.

"JOURNAL" GAS FLOW COMPUTERS

High Pressure
RANGE:
Cu. Ft. of Gas Per Hour—100-10,000 M
Diameter of Pipe—Inches ¾-30
Difference in Absolute Pressure—Lbs. per sq. in., 1-500
Sum of Absolute Pressures—Lbs. per sq. in., 2000-20
Specific Gravity—1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure
RANGE:
Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter—¾" to 48" (including standard and actual weight up to 4")
Pressure Loss—Inches .01-10
Length of Pipe—Feet 30-30,000
Specific Gravity—1.5-.35
Constants—1400-1000

Made of durable celluloid, encased in a convenient leatherette cover with complete instructions. Actual size 6¼ x 7½

3.50 Each Postpaid

American Gas Journal
53 Park Place, New York 17

GPM
IRON HYDROXIDE

The mark of
unerring dependability
in purification

GAS PURIFYING MATERIALS CO., INC.
3-15 26th Ave.
Long Island City 2, New York

Book Review

Gas Analysis & Testing of Gaseous Materials, U. J. Altieri, B.S., Chief Chemist, Eastern Gas and Fuel Associates, Boston, Massachusetts. Published by the American Gas Association, 420 Lexington Ave., New York, 560 pages, size 6 x 9 inches; price to Association members $5.00, non-members $7.50, postpaid.

It is a comprehensive book of standards for sampling, analyzing and testing gases and gas mixtures containing varying amounts of liquids and solid dispersoids. It gives clear understandable details about materials and processes in the gas phase, particularly as applied in the great variety of situations arising in and related to the gas industry.

Chapters I to VI cover kinds of materials, processes, local factors, and purposes of work; properties and composition of gases; measurement of quantity and flow; selection of methods of sampling, instrumentation and process control; apparatus and reagents; common operations; general calculations. Remaining chapters, VII to XX, are devoted to specific methods, tests and facilities showing usefulness of analysis and testing of materials and processes in the gas phase.

The American Gas Association Committee on Revision of the Gas Chemist's Handbook assigned to the author the task of revising the gas analysis chapter of the "Gas Chemists' Handbook" and writing the text to cover important subjects listed by the Revision Committee. These new subjects comprise about three-fourths of the text. Thus, a comprehensive book of standards for gases and gases containing varying amount of liquids and solids is now available.

Federal Power Commission Notes

Hope Natural Gas Co.

The Federal Power Commission has received (1) an application from the Hope Natural Gas Company, Clarksburg, West Virginia, requesting authority to construct and complete by December 1, 1946, a number of major additions to its present transmission system in West Virginia in order to meet the alleged increasing demands of its wholesale customers, principally The East Ohio Gas Company, and an application filed by The East Ohio Gas Company, of Cleveland, Ohio, for permission to construct a 144-mile pipeline extending from Hope's outlet at the Ohio-West Virginia state line to the outskirts of Cleveland, Ohio. The estimated cost of the Hope constructions is $5,237,500 and that of The East Ohio Company, $4,620,000.

According to Hope's application, it has along with other independent producers, been prospecting for several years for gas in Wyoming County, West Virginia and "considerable reserves have been discovered." The company is carrying on negotiations with the independent producers in Wyoming County for long-term contracts for the purchase of natural gas and is itself engaged in extensive drilling in that area. The application states that the unprecedented demands of domestic customers during the present winter and the prospect of continued increases necessitate the connection of these reserves to its system during the present year. It adds that in a second effort to meet the increased demands, Hope has entered into negotiations with Tennessee Gas and Transmission Company for a long-term contract through which it would be supplied with an additional 25,000,000 cubic feet of natural gas per day from the additional facilities Tennessee is seeking to acquire and operate in its application filed under Docket No. G-678.

Northern Natural Gas Co.

The Federal Power Commission has issued a certificate of public convenience and necessity to Northern Natural Gas Company of Omaha, Nebraska, authorizing the construction and operation of facilities that will increase the delivery capacity of the company's gas pipeline system to its market area north of Clifton, Kansas, from an estimated 260,000 Mcf to 270,000 Mcf of gas per day. The facilities will cost about $1,407,748, and are being constructed to meet the company's firm requirements in the immediate future.

Construction consists of thirty miles of 24", and twenty miles of 20", pipe.

Pipe Line Authorized

The Federal Power commisison has announced authorization for construction of a 40-mile natural gas pipe line to serve Nashville, Tenn. The commission granted the Tennessee Natural Gas Line, Inc., a certificate for a pipe line to extend from Westernia, Tenn., to Nashville. It will connect facilities of the Tennessee Gas and Transmission company with those of the Nashville Gas and Heating company.

Koppers Takes Over Wailes Dove-Hermiston Corp.

Acquisition of the entire common stock of Wailes Dove-Hermiston Corporation, of Westfield, N. J., by Koppers Company, Inc., of Pittsburgh, is announced in a joint statement issued by J. N. Forker, Koppers vice-president, and Linden Stuart, president of the New Jersey company.

Koppers Company, Inc., is a designer and builder of coke ovens and manufacturer of byproducts from coal, and Wailes Dove-Hermiston Corporation is a manufacturer and contractor of bituminous coatings for the protection of iron and steel against corrosion.

N. E. G. A. Meeting

(Continued from page 18)

Brooklyn, N. Y., outlined recent developments in distribution practices, and Hall M. Henry, Director of Gas Operations, NEGEA Service Corporation, talked about the new developments in the gas industry. "There is a new spirit in the gas industry," he said, "and it is spending far more for production and other research, and for sales promotion than ever before." He cited many instances to show the forward movement of the gas industry.

A short business session was held at which the following 1946-47 Operating Board of Directors was elected. Chairman, S. F. McCallister, Manchester, Vice-Chairman, Charles W. Rainville, Jr., Salem, Secretary-Treasurer, Edwin R. Clark, Lynn, Mass.

Directors: R. B. Barger, Hartford; Herbert C. Jones, New England Power Service Co., Boston; George P. Langton, Arlington; Edward Niederer, Jr., Manchester; Harry J. Patterson, Lowell; George C. Pearl, The Connecticut Light & Power Co., Norwalk.

S. B. Severson Elected President Dominion and Republic Companies

S. B. Severson, formerly Vice President and General Manager of the Republic Light, Heat & Power Co., Inc., and the Dominion Natural Gas Company, Ltd., was elected President and General Manager of those companies at meetings of the Directors in Buffalo, New York, and Brantford, Ontario, Canada, January 23rd.

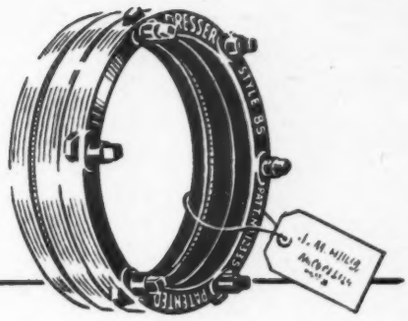
Mr. Severson has been an executive of prominent water, oil, gas, and electric companies in the United States and Canada since his graduation from the University of Wisconsin in 1907.

He has been Vice President of the Republic Light, Heat & Power Co., Inc., and the Dominion Natural Gas Company, Ltd., since 1924—The Republic Light, Heat & Power Co., Inc. serves manufactured and natural gas in numerous communities in western New York, including Niagara Falls, Tonawanda, Kenmore, Batavia, and Dunkirk.

Mr. Severson is at present First Vice President and Director of the Natural Gas & Petroleum Association of Canada, Vice President and Director of the United Fuel Investments, Limited of Hamilton, Ontario, and has been prominent in the affairs of the Canadian Gas Association for a number of years.

Mr. John R. Reeves, General Superintendent of the Dominion Natural Gas Company, Ltd., was elected Vice President of that company to succeed Mr. Severson.

• **It comes as ONE PART**



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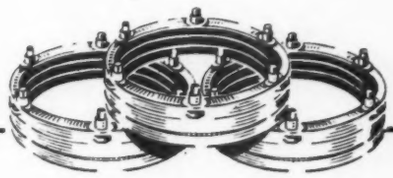
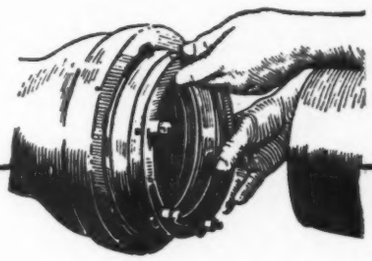


• **It's installed as ONE PART**



...that's why the Dresser Bellmaster Joint saves time all around

The Bellmaster Joint, an exclusive Dresser development, is the only bell and spigot joint that is shipped and installed as a unit.

No handling of loose parts means reduced warehouse costs, and faster installation. After the pipeline is built, unused joints can be returned to stock easily.

The engineering back of the Bellmaster has given cast-iron pipe users what is even more important—unusual flexibility through the resilient gasket seal that assures permanent tightness and protects the line from leaks and breaks.

This joint is for new construction—it is not a repair device. When ordering the pipe, specify "Bellmaster pipe, for use with Dresser Bellmaster Joints". For more information, write for Catalog 441-A or send us your inquiry.

★ ★ ★

DRESSER MANUFACTURING DIVISION
Bradford, Pa.
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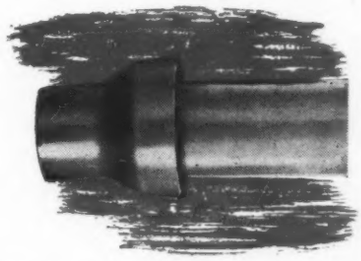

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